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TODAY
THE VIDEOTEX/COMPUTER MAGAZINE

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Dear Reader

Computer crime has crept ahead of the Information Age.

It has done so primarily because we Americans — who pride ourselves in being so well informed — are informed but not knowledgeable about computer crime.

The national media, in its breathless, headlong rush to provide us with a bit of "news" before anyone else, finds an eager audience in a society that has come to equate information with knowledge.

Such a mentality has allowed us to boil down something as complex as computer crime into a media buzz-word like "whiz kid." That label permits us to miniaturize the problem, point a collective finger at a skinny boy who wears oversized horn-rimmed glasses and say, "See there. It's his fault."

Computer crime, as examined in this issue of TODAY, is more than mischievous adolescents or even security gaps at computer-enhanced companies and institutions. Crime by computer is an issue of social responsibility that may well begin with the home microcomputer user. It is also an issue of society's lax attitude toward an increasingly serious problem.

More importantly, the computer crime problem leads us to examine related issues that will have an even more profound effect on our lives in the next few years — namely personal data security and privacy.

Will we apply critical thought to these issues or will we simply look the other way and point an accusing finger at computers? Will we be able to see through our own informational smokescreen that the computer is pointing back at us?

We will remain beneficiaries and masters of the Information Age to the extent that we use our minds to apply the products of its technology. It is the only way we will profit from the Information Age while leaving its problems behind us.

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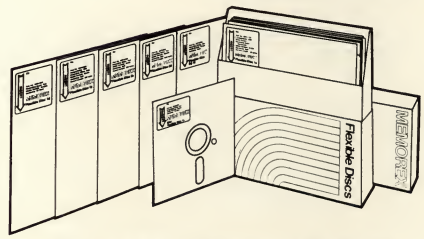

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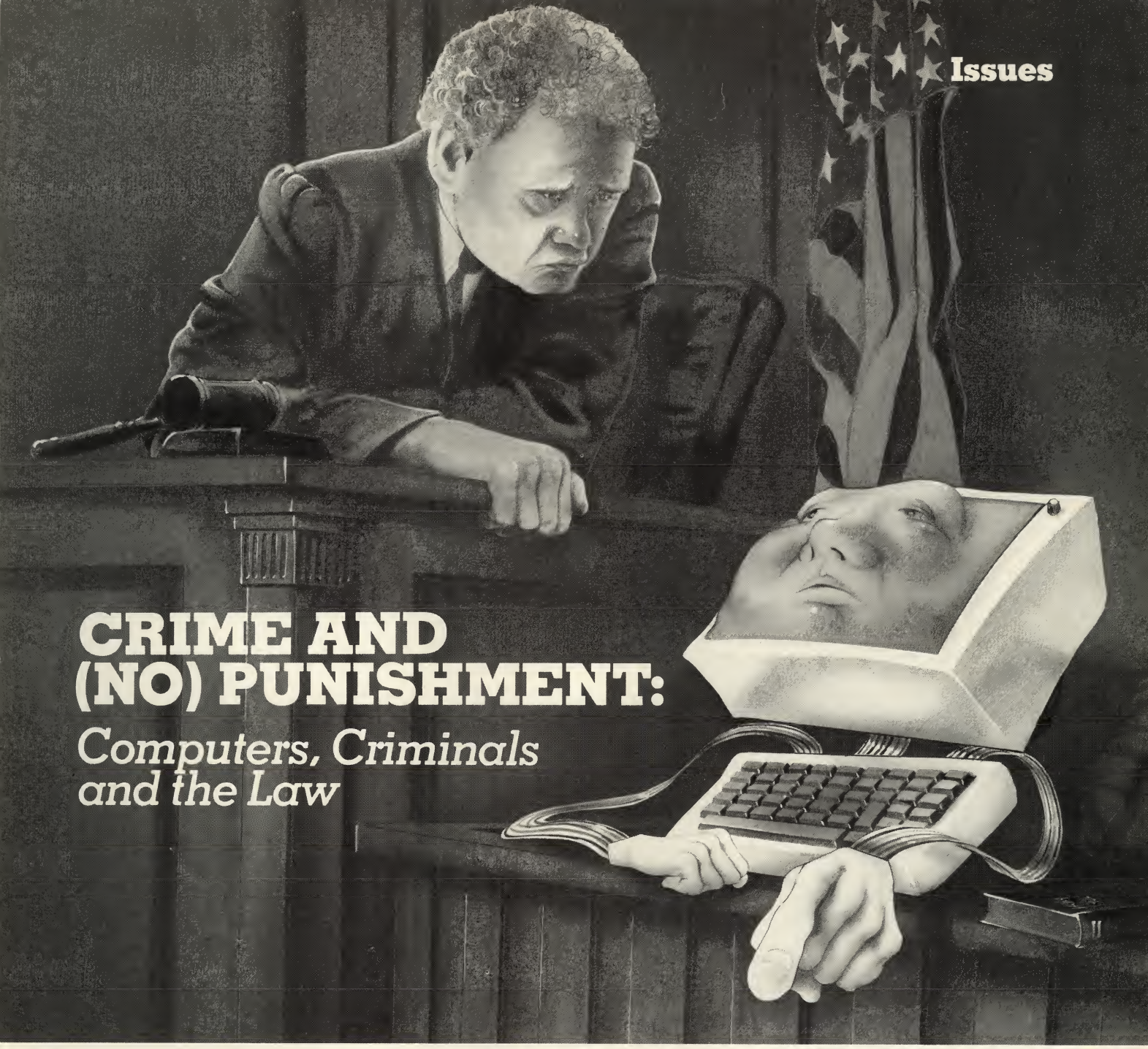

CRIME AND (NO) PUNISHMENT:

Computers, Criminals and the Law

by Carole Houze Gerber

Computer-related crime — ranging from major bank heists to just plain vandalism — is growing at epidemic proportions. In its wake, business users are struggling with security gaps; law enforcement agencies with social apathy and a lack of specific, enforceable laws and home users with the ethical and moral questions of privacy and responsibility. As always, the problem is how to control the people who control the machines, and to determine where the responsibility begins.

In New York City, four 13-year-olds used their school's computer to infiltrate the computer information networks of 22 Canadian firms. Over the course of several months they shut down systems, accidentally destroyed files—and ordered 10 cases of Pepsi through a company which processed data for the soft drink giant.

On the west coast, a young man led a gang of L.A. high school students in breaking into various systems around the country. Hardest hit was U.S. Leasing Corporation, which suffered $250,000 in losses when the gang's activities caused a system shutdown.

Ivory towers have not protected universities from computer crime. Chicago's DePaul University suffered at the hands of two home computer jockeys — both teenage boys — who through their micro's telephone hookup, randomly generated master codes until they found one allowing them access

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to the university's system. Once inside, they changed the system's master codes — shutting down DePaul's computer for a week.

Are these simply isolated incidents or has breaking into computer systems replaced more mundane forms of vandalism? A preliminary study by SRI International, a California consulting firm, indicates that this type of computer crime is a growing problem.

According to Donn B. Parker, a senior systems consultant for the firm, unauthorized access to computer systems — known in the security field as "technological trespass" — is reaching epidemic proportions.

"There are thousands of kids out there attacking the system for fun and games," says Parker, who recently appeared on the investigative television show "20/20" to discuss the issue. "There are also a bunch of older people who are doing it—or who are encouraging young people to do it. A professor of computer science at a university in Arizona told me he encouraged his students to attack systems because of the educational value."

Compared to the more serious crimes of embezzlement, software piracy and copying or destroying data, attacking systems to steal time, eavesdrop or simply brag about having done it may seem fairly tame. So tame, in fact, that Parker says many insist their entry into such systems isn't illegal or immoral. To those who gain nothing but free entertainment or an ego trip, embezzlers are the real criminals. Many see their unauthorized use simply as an extension of the sort of mind-testing strategy otherwise available in a rousing game of Adventure.

"It shouldn't be socially acceptable to hack (gain unauthorized access to) systems. Teachers, parents and employers have to make that perfectly clear," says Parker. "People will agree that breaking into someone's home is wrong, that stealing from a store is wrong. The same agreement on values has to apply to accessing computer systems."

To the uninitiated, computer criminals — especially those who pull off the big inside heists of funds — must have the daring of Robin Hood, the brains of Einstein and the cunning of Capone. In fact, says one source, while some who commit computer crimes are fairly bright, others are simply average people with time on their hands and embezzlement on their minds. Because the news media plays up the whizzes, says Oliver R. Smoot of the Computer and Business Equipment Manufacturers Association, the average criminal Janes and Joes are overlooked. "The largest continuing area of losses from information systems is from authorized users who abuse the authorization," Smoot was quoted as saying in a recent issue of Science News. Further, it's often clerks and administrators rather than computer experts who are pulling off the inside jobs.

Charles Hagan, vice president of management information services at Burns International Security Services also says that it's often the average people, not the geniuses, who abuse the system. "Whiz kids are the exception to the rule," he contends. "If a person has a little bit more than the average amount of larceny in his heart, he can attempt a computer crime."

Teaching companies to put a lid on computer crime — or at least make it tougher to accomplish — has become a thriving consulting business for Norman Harris and Kenneth Sherman, founders of HSH National Management Inc., a computer security and disaster research firm in Worthington, Ohio. Unfortunately, says Sherman, the preventive aspects of their services are too often overlooked until a serious breach of security occurs. "Once a company gets burned, they get very sensitive about security and top management will get involved," he reports.

In defense of this delayed reaction, Sherman points out that most EDP departments are so inundated with handling the day-to-day operations of their companies that attempts at setting up elaborate security systems fall to the wayside. That's where firms like HSH and Price Waterhouse, two of the country's leaders in security and disaster research consulting, come to the rescue. "We're hired to do only one job and do it well," says Sherman, "and that's to make the EDP operations as secure as possible."

But, says Charles Hagan of Burns International Security Services, "Each company has to assess its own risks. Business owners can get so hyped up about security that they want to put cryptographics [a scrambler code] on everything. If files can be recreated in one day from other information in the company, there's no point in putting expensive security measures on the system."

Those who do have invaluable information in their files and have taken some steps to protect their systems are often surprised at how ineffective their security measures actually are. Sherman and other HSH consultants make a point of showing clients that EDP rooms and systems the company considered inviolate are usually fairly accessible.

"We have gone into the computer rooms of several clients — and on back into their tape libraries to check out tapes. We had no ID but acted as though we knew

what we were doing. In another case, we got into another maximum security area just by watching an employee punching into the key lock system and memorizing the number."

Perhaps because of the casual personal atmosphere in some EDP rooms the security measures can occasionally become lax: Face and name recognition in lieu of badges, system entry passwords taped to the fronts of terminals and an impatience with the time needed to consistently take precautions against crime.

What security consulting firms offer is a methodical, problem-solving approach to protecting systems that includes recommendations about physical facilities and software safeguards—among other measures — that make it tougher to both insiders and outsiders to abuse the system. Robert Farrow, a consultant with Price Waterhouse, says that his firm's data security review involves six key areas. These include a review of the data processing organization structure relative to data security, including evaluating the potential weaknesses in personnel policies, management, internal auditing and the segregation of duties within data processing. Also examined are remote terminal controls, including password control procedures; an evaluation of the audit trail which should provide a complete record of all users; a review of data integrity and processing controls; physical security controls, including protection against fire, natural disasters and sabotage; and an evaluation of communications security to ensure accurate entry of transaction data and prevent the loss of information. HSH offers essentially the same type of services.

According to Farrow, companies suffer three types of access problems: unauthorized obtaining of information, changing information and deleting information — the latter is known in some circles as "trashing files." Whether done for recreation or remuneration, the end result is the same — money lost either by direct theft or, sometimes indirectly, by a system shutdown. Security experts generally agree that presently there is no inviolate system, no matter what security measures are implemented. "No system is completely secure," admits Sherman. "You can only build so many software safeguards into the system. There are a lot of software packages that can deter people but given the right person with the right amount of intelligence and determination — given time, he'll break into the system."

> "It shouldn't be socially acceptable to hack systems. People will agree that breaking into someone's home is wrong, that stealing from a store is wrong. The same agreement on values has to apply to accessing computer systems."

But, as Farrow points out, proper security measures can and do deter criminals. Far too often, failure to implement controls is an invitation to abuse. "Company cars are not left parked on the street with the keys in the ignitions," he says. "Computer systems should not be left open and unattended either."

Security measures not only protect the company's assets — they also protect employees from themselves. According to HSH's Sherman, the typical computer criminal who attempts to pull off an inside job is not a scheming, hardened individual who wormed his way into the corporate environs with the express purpose of perpetrating evil deeds. Instead, because of lax security, opportunity for personal gain knocks repeatedly and many employees open the door to crime.

"The employee has had a good record, has been with the company for two or three years and thinks 'Who's going to catch me?'," Sherman theorizes.

Too often, the answer is "no one."

And, says Sherman, those who are caught often go free. "I know people who are out on the street today who have committed crimes. If you were a business owner with stockholders to report to, would you want them to know your firm was so vulnerable?" he asks rhetorically. "Also, they fear once the word is out on them, others will try the same thing."

A classic case reported recently in the Smithsonian Magazine involved a bank heist of $8 million by an employee. When confronted, he pointed out that prosecuting him would publicize the flaws in the system that enabled him to pull off the job — and that to correct its system would cost more than the $8 million he stole. He walked away unscathed — a rich and supremely self-confident fellow.

Among the security measures both large and small companies can take to protect themselves are password controls, having adequate physical security protecting the room and the building, stepped

up hardware and software safeguards and a closer monitoring of personnel involved with EDP operations. Consultants stress that each company's operations are unique and no one combination of security measures will work in all cases.

Donn Parker of SRI International offers a solution that doesn't sit well with home computer manufacturers—making systems less user-friendly. "We're trying to find ways to compromise on the user-friendly aspect. Obviously a totally unfriendly system would be very secure because no one would use it. On the other hand, if systems become too user-friendly we may be inviting abuse. I think the idea of using some sort of protective logo as a warning to trespassers might be of value," he asserts.

Parker adds that vigorous prosecution of computer crimes at all levels — including the so-called "harmless pranks" — would act as a deterrent. Presently, however, laws related to computer crime are a patchwork of inconsistent legistation that encompass only 15 states. Further, federal jurisdiction is minimal. According to Dave Cassens, an FBI white collar crime expert, in cases where information, not money, is stolen, it's hard to put a value on the crime. (The FBI becomes involved only when stolen property has a value of more than $5,000 and goes over state lines.)

"A lot of people believe the FBI is involved in solving most computer crimes when in fact it has very little jurisdiction — unless Congress passes any of the computer crime bills it's considering. We do, though, have intensive training for our agents in this area and we recruit people with computer backgrounds," Cassens reports.

With more than 100,000 computer sites in the United States and Europe constantly transferring funds and information and an estimated annual loss of from $300 million to $5 billion from computer crimes, additional legislative safeguards and software supports cannot arrive too soon for many businesses.

Parents must be held responsible for the actions of their children—a stern warning about the uses and abuses of home computers is the first step in crime prevention.

What can the estimated 2 million home computer owners do to make their files secure? Simple security measures such as locking up disks containing personal and financial information is one method. Another is to minitor closely those having access to the computer. Friends of teenage children, not to mention the youngsters themselves, can accidentally destroy files, reveal information to outsiders or use the computer to gain illegal access to larger systems. As juvenile computer crime expert Donn Parker has stressed, many youngsters feel breaking into systems is a lark. Parents must be held responsible for the actions of their children — a stern warning about the uses and abuses of home computers is the first step in crime prevention.

For those seeking additional protection, an encryption system, which codes messages by translating them into a mathematical formula, may be the answer. The information is rendered unintelligible to all but the encoder with the password key which unscrambles the data. Encryption is available from a number of software manufacturers. Prices start at about $40.

Ultimately, the effectiveness of methods for deterring crime rest with individual users. An expert at Sperry-Univac has estimated that fully 50 percent of computer fraud and theft results from human error — particularly inadequacies in software systems. As more people learn programming and gain access to systems, either through home computers or as EDP employees, the opportunities to perpetrate crimes will increase proportionately. Improved hardware which has built-in security systems, more sophisticated software and — the ultimate safeguard — better screening of those having access to computers, are important factors in reducing the risks.

Embezzlement, theft, breaking into offices and rifling files — all these crimes have been around as long as written records. In every instance, a human being was responsible for the wrong-doing. Computers, rather than being the source of crime, merely act as electronic doorways for the mischief of man. Putting moral, mechanical and legislative locks on computers may well be one of the greatest challenges of the next decade.

Carole Houze Gerber is a contributing editor to TODAY magazine.

COMPUTER CRIME LAWS

by Jeff Roedel

Detection and apprehension of a "computer criminal" is only half the battle. The lack of good laws in this country — or the lack of sufficiently specific laws — makes prosection of those criminals difficult.

In the absence of a federal statute specifying the use of a computer in the commission of fraud or embezzlement, U.S. attorneys are forced to apply statutes that deal with crimes like interstate theft or tampering with government property.

The same constraints apply to the Federal Bureau of Investigation, which must pursue criminals on grounds such as fraud by wire, fraud against the federal government or a government contractor, interstate transportation of stolen property or robbery of a federally insured financial institution.

But the FBI is not standing still while the computer crime world rushes by. Twice each year, agents are selected to participate in a three-week program called "Investigative Techniques of Computer-related Crimes." The course is taught by the Economic and Financial Crimes Training Unit at the FBI academy in Quantico, Va.

According to supervisory agent John Lewis, the course is the only one of its kind in the world designed by, taught by and given to law enforcement personnel. Lewis says up to 25 percent of all FBI agents are involved in the investigation of white collar crime, in which computer crime plays a significant role. He says the FBI would prefer a federal statute that specifies crime by computer, but without such a law, it will pursue such crimes on the grounds it has available.

Lewis may not have long to wait if Rep. Bill Nelson, D-Fla., has his way. Introduced during the 1979-80 Congress, Nelson's bill faced its first round of hearings in late September, 1982. It's modeled after a bill introduced by former Sen. Abraham Ribicoff, D-Conn., in 1979. That bill never reached the Senate floor and because of Ribicoff's retirement, was withdrawn.

Nelson's interest in the issue springs from his days as a state legislator in Florida, where he was responsible for the enactment of that state's computer crime law. Essentially, the Nelson bill would amend the criminal code by adding provisions that specify as criminal violations the use of a computer with intent to defraud, gain property or embezzle. The bill also deals with vandalism of computer hardware and damage to data stored within.

If passed as written, the law would apply to U.S.-owned and -operated computers, computers involved in interstate commerce and computers used at federally guaranteed financial institutions — such as banks insured by the Federal Deposit Insurance Corporation. Although the range of computers protected appears narrow, in fact, a computer large enough to make it worth the attempt to defraud could be construed as falling under the law.

The Ribicoff bill was also a model for Arizona's legislation. It's one of two varieties that appear to be the mainstays for state legislatures. While some states, such as Arizona, have chosen to add new language to their criminal codes — language which applies only to computers — others have been inclined to simply modify the definitions of words already contained in the state laws.

Ohio, the most recent state to pass computer crime legislation, chose the latter method. "People were expressing concern that the existing Ohio legislation was inadequate, that it did not ensure a conviction," says Ohio Rep. Charles Saxbe, the bill's sponsor. "We came to the conclusion that we needed enhanced language."

The words that were enhanced are "property," "services" and "writings." Ohio law now views certain computer-related items as property and makes computer services and writings (data) things that can be embezzled or defrauded. Before the law's passage, such distinctions had to be left up to the judge.

Other states that have made computer crime explicitly indictable are California, Colorado, Illinois, Michigan, New Mexico, North Carolina, Rhode Island, Utah, Virginia, Maryland, Hawaii and Missouri, as well as Arizona and Florida.

Another area of law, aimed at protecting the programmer rather than the data, is copyright. The most recent overhaul in federal law was the Copyright Software Act of 1980. That law updated the 1976 Copyright Revision Act by calling a computer program a "set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result." That provision covers software in the form of a source code, (programming language) but leaves open the question of whether object code (machine language usually in a binary code) is covered. Object

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Adventure

GET ALL THE TRAPPINGS

Trapped in Colossal Cave? Egad! But wait! There is a ray of hope: If you can remain alert and avoid the wrath of the Dragon, you will get out alive — maybe.

As you pull your genuine Adventure t-shirt against the damp chill of the Cave, you wisely decide to keep awake and alert by putting together the challenging, full-color 500-piece Adventure jigsaw puzzle.

Hours later, as your lantern begins to dim, the last piece falls into place. You hear the Dragon snoring in his den and quickly whip out your Adventure350 and Adventure750 maps to plot an escape route.

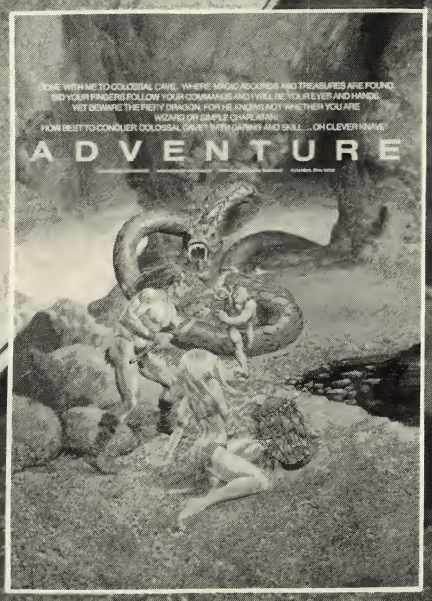
Following the maps, you tiptoe past the dragon and into the gleaming light of the Upper World. Tucked under your arm is a colorful Adventure poster — a souvenir of a most Adventurous day.

But what was that noise? The Dragon laughs. The only reason he spared your life was because you were wearing an Adventure t-shirt!

The Adventure t-shirt — S,M,L children's sizes; S,M,L,XL, adult sizes; Available in light blue, red, tan, yellow, black and kelly green. **$8.95**

Adventure350 Map — Conducts players through Adventure game maze. Not guaranteed to bring success in video version. Black ink on white paper. Size 17x25″. **$2.95**

Adventure751 Map — Advanced version for Adventure aficionados; size 23x35″. Black ink on parchment. **$4.98**



Full Color Adventure Poster — Provides Adventure inspiration to even the most travel-weary explorers. Size 18x24″. **$5.95**

Full-color Adventure Puzzle — Features 500 interlocking pieces depicting an Adventure game confrontation between explorers and the fiery Dragon. Finished puzzle size is 16x20″. **$8.95**

To order your Adventure items, send a message via Feedback (main menu item 5, user information). Please allow 4-5 weeks for delivery.

INFORMATION ABUSE AND THE PERSONAL COMPUTER

Dave Mankins

by Alan F. Westin

Please type your terminal identifier: C
-1464-004-
Please log in: APPLEX;;
Welcome. You are connected to the Apple X system. Please type your password:
CHUCK JONES
Message to: the MIT Alumni, Friends of the Earth, and Plato's Retreat Club Networks –
12:00 p.m., 21 June, 1989

It was never in my wildest dreams. When I bought my Apple III in 1982 and did my first bookkeeping routine, I never imagined the kind of nightmare that was in store for me just seven short years down the road. In one brief month, the IRS subpoenaed my Financial Package and my Travel File and assessed me for a $3000 underpayment penalty. My first wife had her accountant analyze my Stock File and convinced the court to raise her support payments by $500 a week. The Federal Aviation Authority wants me to submit a copy of my Activities File and my Health Portfolio along with my application for renewal of my amateur pilot's license.

As if all this wasn't enough, my boss at the Radiant Valley Nuclear Power Plant made a dark remark about a new investigative service the plant recently subscribed to — adding that people who belong to a "pinko network" may not have much of a future with the firm.

What's really appalling about all this is that I did it to myself. They got it all from my Home Information System on the innocent little Apple that I purchased with such good intentions.

Last week, I heard that an insurance company refused to pay for items stolen from someone's house after the company examined his Home Security Management System and discovered he'd forgotten to turn on the double alarm the night his home was burglarized.

Well, they won't have me to pick on anymore. After you read this message, I'm dumping the master file. Except for my Star Battle Expert's Drill, the Old Movie Buff's Corner, and the Japanese lessons, this is the end of my home database. I can live with cryptic notes scrawled on yellow pads if that's the way they want to play it. I'm going low-tech.

Log out. Log off.
12:40 p.m. 21 June 1989.

During the 1960s and '70s, public concern over protection of privacy in computerized information systems focused on the electronic-data-processing (EDP) activities of the large businesses and government organizations that were able to afford the enormous costs of computing in those decades. The public looked to the automated files of the FBI, the IRS, and the Social Security Administration; to state licensing, motor vehicle, and criminal justice bureaus; and to local welfare, health, police, and education agencies. In the commercial sector, the concern centered on computer uses by banks, credit bureaus, insurance companies, employers, hospitals, and similar keepers of sensitive personal information.

The key issue in that era was how to ensure that such EDP uses would not infringe on the privacy or due process owed to a citizenry whose benefits, rights, and opportunities were being increasingly determined by the record-based decisions of large organizations.

To this end, we developed the first generation of new privacy rules between 1960 and 1980. While this action was fueled by general anxiety over potential invasions of privacy by new "data bank" technology, important events also warned us that the problem of information abuse by authorities was far from imaginary. We witnessed U.S. Army surveillance of civilian dissenters in the late 1960s and early 1970s, the Watergate affair in 1972, and businesses gaining easy access to personal information used to judge people for credit, insurance, and employment.

The set of new laws created in the 1970s formed a framework of "fair information practices" for many business and governmental groups using personal data. We enacted federal legislation such as the Fair Credit Reporting Act (1970), the Federal Privacy Act (1974) to cover federal agency practices, and the Financial Right to Privacy Act (1978) to protect bank records from improper federal intrusions. State privacy legislation followed along the same lines and also dealt with other areas, such as insurance, employment, and health care. The hearings and report of the U.S. Privacy Protection Study Commission (1975-77) and surveys in the late 1970s that showed strong public concern over business practices led many business and nonprofit organizations to adopt voluntary fair information practice codes, even where no official legislation had been enacted to cover those organizations' activities.

Protecting privacy in organizational information systems continues in the 1980s, as new and larger EDP systems and interorganizational networks are adopted by business and government. Now, the microcomputer revolution has brought us small, powerful, low-cost machines that stand alone and can be used to process large amounts of personl data within the home. Two million of these little beauties are already plugged in today, 5 million are expected to be humming in 1985, and industry forecasts for 1990 range from lows of 8 to 10 million to highs of 15 to 25 million.

"Computing power to the people" has become the 1980s slogan of an industry whose 1981 sales of $2 billion make it, as *Forbes* recently noted in capitalist wonder, "already as large as the dogfood business."

Abuse Potential

Most of the 2 million personal computers now in use are in the homes of well-to-do Americans. And while these computers are often being used to play games, learn new skills, control activities within the home, and perform various accounting and data-analysis functions, personal computers are also beginning to function in ways that raise critical privacy issues.

Many home computer owners are using their machines as filing systems for personal and family records, inputting financial transaction records, tax information, investment data, medical records, and home and property information. The results are detailed, electronically retrievable files filled with just the kind of personal information that we're most concerned about protecting against disclosure to third parties without our knowledge or consent—financial records that reveal how and to whom we give our money; medical records that reveal potentially embarrassing physical conditions or psychological treatment; and credit card records that reveal where we have been, when, and sometimes even with whom.

Some owners are beginning to use their personal computers to store and work on personal diaries, intellectual materials such as articles and books, position papers and memoranda for use at work or in civic organizations. These materials are obviously valuable as intellectual property, but they also have powerful privacy dimensions, and their disclosure without the owner's knowledge or consent would violate our basic expectations of confidentiality.

Some computer owners are using their home computers to create voluntary, noncommercial networks in order to share common interests and information through data communications.

EOPLE OF THE UNITED STATES,

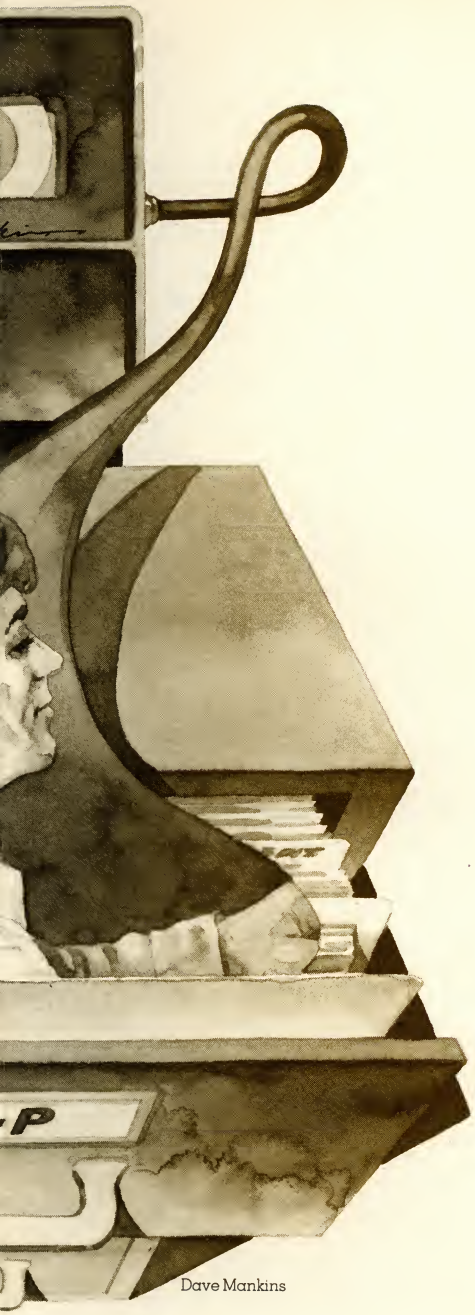
Such private networks create electronic bulletin board systems that send information outside the home and voluntarily open up the owner's data to outside access by network members. Access to the data by persons not belonging to the network or monitoring of network activity by government agencies clearly would raise privacy issues.

What these varied uses of microcomputers add up to is the creation of extensive electronically stored personal data in the home that could be of significant appeal to third parties. Our playful scenario of Chuck Jones's troubles caused by his Apple X in 1989 illustrates some of the possibilities.

Actually the threat checklist of potential demands for information is comparable to files on individuals maintained by the organizations we were so concerned about a decade ago because of their increasing access to personal information:

- Government executive and regulatory agencies could seek access to tax record, credit card expense, or home improvement files, and records of stock purchases, sales, or similar transactional information that could be used to challenge an individual's reports and payments to the government.
- The courts could call for data for civil proceedings such as alimony and separation hearings, in which the income, expenses, and net worth of the parties are a matter of dispute. And, in criminal court proceedings, personal computer records might be subpoenaed — just as telephone toll records are—to prove the location of individuals at a particular time, whether a person knew another individual, or whether they had communicated with another person on a given day or time.
- Law enforcement officials might seek similar location or communication information as part of their investigations, especially when private networks of home computer owners were involved. Or they might demand that persons under suspicion for a crime produce their home computer data or log as evidence of innocence, in the same way some investigative agencies ask suspects to "voluntarily" take a polygraph, or lie-detector, test.
- License boards or employers might require applicants to provide printouts of home educational and employment files as a regular part of the application process.
- Health and life insurance companies might require applicants for coverage under their policies to submit home health files, especially if such files record diabetes, epilepsy, heart attacks, and other life-threatening factors for which fast access to a home health file by physicians would be provided via a telephone link.
- Credit bureaus and banks might ask applicants to produce various tax, expense, or other records maintained in automated home files, especially if standardized financial-information-management packages become widespread in the next decade.

In short, if we assume that home files of sensitive personal information are maintained in electronic databases in the homes of middle-class America and that this information may be communicated outward in private networks, we also have to assume that these databases will become the object of governmental and commercial interest. This interest could generate demands for such data for all the legitimate — and occasionally illegitimate — informational purposes that written records have been increasingly sought in 20th-century society. How should we draw the line between acceptable and unacceptable extraction of data from home-computer files? This important question should be seen as a matter of public policy that we should consider now as the home computer revolution is unfolding.



Dave Mankins

A Data Haven?

In addition to these developing uses of home computers, another area of concern is looming on the data horizon. While the law either forbids or strictly controls the use of information kept by organizations on individuals, personal computers might be used to keep the same information at an employee's home away from the organization's premises and the legal arm. For example:

- A corporate personnel executive might keep information in a home computer about the personal behavior, political affiliations, or other characteristics of employees — information that cannot be maintained under equal employment opportunity laws or that the employee would have to be made aware of and have rights of access to (under state employee privacy laws in eight states today and under the employee privacy rules that hundreds of companies have adopted).
- A police intelligence officer might use a home computer to maintain lists and surveillance data about elected officials suspected of links with organized crime or of political activists suspected of "subversive activities." Such data would be free from the rules regulating the scope and uses of intelligence files maintained at police agency headquarters.
- A medical researcher might create a file at home using personal data about patients at a hospital to conduct studies that would not have been approved by the hospital's human subjects research panel — either because the patients had not given their consent or because the research project's findings, if published, might be felt by such a panel to be potentially harmful to the reputations or privacy interests of the patients.
- A financial officer of a bank might store information about the lifestyle, habits, sexual preferences, and other personal behavior of large individual borrowers or key corporate executives without telling them that the information was being taken into account for that part of the loan decision that rests on the bank officers' judgment of the "stability" of the borrower.

This potential for information abuse has been called the "home data haven" issue by George Trubow, Professor of Information Law and Policy at John Marshall Law School in Chicago. We have to be concerned, he says, that the "work-at-home" trend many social analysts predict in the 1980s and 1990s does not produce a swarm of home databases that operate outside the reach of the fair information practice rules set up to govern an organization's official use of such data.

Fair Information Practices

Do the privacy protection concepts developed in the first era of organizational computing supply us with ways to deal with potential abuses of personal computers at home? It would be easy to extend fair information practice rules to the "data haven" situations in which organizational executives hide files at home by expanding rules or laws to forbid the creation of computerized files off the premises that draw from data about individuals collected in an organization's official business. Another rule forbidding any organizational officer to use off-premises data to make judgments about people on behalf of the organization would increase privacy protection. If an organization allowed its executives to store official data in their home work stations, it would be the organization's legal responsibility to see that the executive complied with all relevancy, notice, update, and individual-access standards that apply when the personal data is on the organization's own premises.

But fair information practices do not lend themselves as easily to the situations in which computer owners develop their own personal data for use at home or

to share in networks. Those rules were developed for situations in which individuals supplied personal data to an organization, or agreed to have an organization secure information about them from third parties, because of benefits or services that the organization offered. In the collection of this information, confidentiality has been assumed.

If we want to install new safeguards for home data, we will probably have to go back to an older privacy rule, the U.S. Constitution's Fourth Amendment guarantee of security for the "person, houses, papers, and effects" of American citizens. During the 1960s and 1970s, the U.S. Supreme Court expanded this Fourth Amendment language to protect the privacy not only of actions, conversations, and papers inside the home or other private place but also of telephone conversations to another party outside the home. The Supreme Court held that when citizens had a "reasonable expectation of privacy" in what they said or did, government must comply with the "probable cause" and "judicial warrant" safeguards of that amendment before it can monitor or seize such conversations.

This updated constitutional principle would seem to cover both personal data maintained at home and that sent over private data networks to people known to and selected by the home computer owner. One would expect the courts to hold that placing personal data or unpublished writings into a private network was not a "publication" to the whole world and that government interception of such data was an invasion of privacy unless done in compliance with Fourth Amendment standards and procedures.

Because judicial protection of home computer files will have to await test case rulings in early cases challenging government tapping or subpoena of such data, any significant private or government move to reach home-based data would justify consideration of federal legislation to define privacy rights in home information systems and set up specific procedures for third-part access to such information.

When I wrote the book *Privacy and Freedom* in 1967, I recommended that the wiretapping statute Congress was considering at that time ought to go beyond the control of telephone tapping to include a provision dealing with data communications. Congress chose not to deal with digital data in its 1968 Omnibus Crime Control Act, probably because the issue was too new. But there would be no impediment to Congress deciding in the 1980s that it was time to add such a provision to the 1968 law. Alternatively, home file protection could be spelled out in an independent federal statute that would specify what kinds of files qualified for such protection, when government could require their production or intercept them without notice, and more.

The concept of privacy that was spelled out in fair information practice codes during the era of organizational computing did not assume that people should not have to provide relevant and truthful information about themselves when they asked organizations to give them benefits or services, or that government agencies and courts were not entitled to demand documentary evidence be produced where the public interest properly

If the Chuck Joneses of the future are not forced to dump their master files and lapse back into yellow pad record-keeping, we will have to start thinking about extending basic privacy protections to home computing before it's too late.

required it.

What the fair information practice codes did insist on, however, was that in setting the balance among the individual's claim to privacy, organizational needs for disclosure, and society's need for protective surveillance, we must give privacy (and due process) rights special weight if we are to preserve the conditions of freedom in an increasingly data-driven social system.

If the Chuck Joneses of the future are not to be forced to dump their master files and lapse back into yellow pad record-keeping, we will have to start thinking about extending basic privacy protections to home computing before it's too late. This time, we can't depend on the organizational computer users to take the lead with voluntary codes, or public policymakers to tell such organizations what to do with their databases. We must extend the legal concepts of the Fourth Amendment to the "electronic papers" of home life in the microcomputer age.

Alan F. Westin is Professor of Public Law and Government at Columbia University and the author of Privacy and Freedom, Databanks in a Free Society, Information Technology in a Democracy, and numerous papers on the issues of privacy and computer-based information systems. He is now vice-chairman of the New Jersey State Commission on Individual Liberty and Personal Privacy and president of the Educational Fund for Individual Rights.

From "Information Abuse and the Personal Computer" by Alan F. Westin, appearing in the August, 1982 issue of Popular Computing magazine copyright © 1982 Byte Publications, Inc. Used with the permission of Byte Publications, Inc.

NETWORKING & DATA SECURITY

Data security involves more than just the proper use of user identification numbers and passwords. Data security is multifaceted, involving people, buildings, software and the actual computer systems.

At CompuServe, security involves respecting the privacy of customers' date files and building in redundant systems to protect data and the privacy of real-time electronic communications characteristic of videotex systems.

Here are some of the measures CompuServe has taken to provide data security and customer privacy:

- Each customer is assigned a private area in the system that is accessible only through a confidential password and number combination unique to the user.
- Unlike most passwords to computer systems, passwords issued by CompuServe contain a minimum of eight characters and include a noncharacter symbol, dramatically decreasing the possibility of someone accidentally guessing a password.
- Passwords can be changed on-line immediately by customers, decreasing the likelihood of unauthorized access in the event you misplace your original password.
- On-line disk data is protected by daily back-up on magnetic tape, stored in an off-site vault. This virtually eliminates the chance of data loss due to hardware or software failure.
- A back-up computer is always available in the rare event of a system failure.
- CompuServe maintains two computer centers, each fed by separate telephone and electrical utilities enhancing reliability and reducing data loss in the unlikely event that utility service would be temporarily interrupted at one site.
- Access to both computer centers is controlled through electronic card key doors and a 24-hour television monitoring system.
- Both computer centers are equipped with uninterruptible power supply systems, backed up by diesel generators to ensure continuous operation in the event of a utility power failure.
- Both computer centers are built to withstand severe weather conditions with special landscaping and brick and concrete construction. The computer centers are windowless with walls reaching a thickness of 16 inches.
- Computer room access is limited to authorized personnel only. Visitors to either facility are required to register at the security desk and must wear the proper security badge identifying them and the employee who must accompany them during their visit.
- A permanent security committee reviews security measures on a periodic basis.
- Heating and cooling systems are automatically controlled to maintain stable temperature and humidity levels for maximum computer reliability.
- The computer systems have multiple operating levels, permitting access to certain data only within designated operating levels.
- Highly sensitive files run only on isolated systems and are accessible only from special terminals by authorized personnel.
- The public communications

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Hard Cash for Teens in

George Olson

Swarms of young people go to public arcades these days to pit their skills against electronic space creatures on video screens. Others in the comfort of their own homes face fire-breathing dragons, malicious millipedes, and voracious space denizens by the dozen with a flip of a switch on the family microcomputer.

Parents who ostensibly bought their microcomputers for business or family-finance purposes usually wind up sharing their children's enthusiasm for computer games. But the youngsters — fascinated by the technology and with more time on their hands — frequently go beyond game playing and learn to design their own games and other software.

Some teen-agers have found a market for their programming talents. Even a few pre-teens have gotten into the software business. Steve Grimm and Nikolai Weaver of Los Gatos, California, for example, wrote a word-processing system called "Filewriter" when both were 12 last year, and they began advertising it in a computer magazine under their own company label, Plum Software.

Annual royalties from a software company to an author of a best-selling game or business program are said to reach $25,000 and even $100,000. But money does not appear to be the primary motivation for teens and pre-teens — at least not initially. "It just seems like play to us" is the modest comment of South Carolinian Wayne Westmoreland, 19, who with younger partner Terry Gilman has three published games to his credit and another forthcoming.

But the fun element does not diminish the weight of their accomplishments. Successful young programmers have difficulty ex-

Software

by Carol L. James

plaining their special abilities, but some point to computer literacy somewhere in their family backgrounds as partial explanation of their interest in micros. Considerable native intelligence and an affinity for reading, mathematics, and electronics are often mentioned by industry experts as critical factors.

"We don't have any kind of *Wunderkind* in the house we don't understand," says the father of 17-year-old Owen Linzmayer of Morris Plains, New Jersey. Owen, described as "pretty much of a self-starter," first learned programming on a big computer his father used in the basement at home before the family bought a personal computer. He also helped his father with a microchip business, which Owen soon took over. At age 16 he sold the business at, he says, "a nice profit," to allow more time for schoolwork as well as to coauthor a book on arcade games and to write and program for *Creative Computing* magazine.

No one in John Uhley's family seemed especially interested in computers when John started learning about them at age 8 or 9 and chose to take an advanced computer course "at about 13." "I boggle their minds, " says the 16-year-old from Marin County, California. He has done some business programming recently on a free-lance basis and has studied with such experts as Scot Kamins, a San Francisco computer consultant who considers Uhley one of his most promising protégés.

High-school student Steven Sacks, 16, of Los Angeles — who says he is "basically self-taught" on his personal computer "except for one summer computer course" — wrote two games, "Chambers of Xenobia" and "Race for Midnight," and had them published recently by Avant-Garde Creations of Eugene, Oregon. Each is an adventure game. Players must find their way through a labyrinth of dungeonlike chambers filled with monsters guarding treasures. Participants earn points for each challenge survived.

A closer look at "Chambers fo Xenobia" and "Race for Midnight" helps illustrate how programs are written. As the games are played, pictures of rooms and objects appear on the video screen attached to the computer keyboard. So do occasional narrative descriptions such as: "You enter the room and are confronted by a ghoul. There is an emerald lying under a table against the wall." The player must deal with the ghoul before pocketing the gem and is told to type a two-word command on the keyboard. The player may try, say, "Zap ghoul." The computer searches its memory for the correct command that will remove the creature. If "zap ghoul" is incorrect, the program may or may not allow you another chance.

In designing these games, Sacks had to specify every single aspect for the computer, step by step, as well as anticipate most of the responses players might give in each of many possible situations. He typed directions that told the machine, in effect, "If player says, 'Annihilate ghoul,' you will answer, 'Try another command.'"

But to instruct the computer in a language it could understand, he used a combination of two commonly used programming languages—Assembly and BASIC. Each game step was represented in a typed, numbered line containing a series of odd-looking language symbols.

In addition to programming the game's action, Sacks programmed appropriate music and sound effects through the computer's speaker and added color graphics by using software that allows "drawing on the screen." When he was satisfied with the programs — each of which involved thousands of numbered lines stored in the computer's memory, lots of test play with friends to iron out bugs, and countless hours of patience — he copied the games on vinyl disks and sent samples to Avant-Garde for possible publication.

High-school senior Richard Bouchard of Amherst, New Hampshire, joined the part-time staff an another computer magazine, *Softside*, during his freshman year and continues to work there after school as a writer and programmer. He became familiar with microcomputers when his father bought one "just for fun."

Bouchard's former boss, editor George Blank, recalls an incident shortly after Bouchard's arrival at *Softside:* A visiting international software distributor remarked to Blank that he had read about a new programming language that sounded useful, but he hadn't been able to get it to work for him. Bouchard overheard the comment, dug out the necessary information from the files, and, typing extremely fast on an office computer, "had the program running in five minutes."

Blank says Bouchard also designed a sophisticated, computerized, mailing-list routine that speeded up the magazine's subscription service. Since then he has also written software for other types of computers for businesses and a school near his home.

Parents seem delighted when their children are among the few who manage to make money in programming while still in school, Jay Zimmermann, 16, of San Diego

County, California, who works after school every other day for a software company, says his parents "think it's great" as long as the job isn't too time-consuming.

Financial success does not seem to create many barriers between young software experts and their less affluent friends. Jim Nitchals of Del Mar, California — whose game "Bug Attack" made the *Softtalk* bestseller lists before he recently turned 20 — says of his contemporaries, "If they're jealous, they hide it well." He notes that most of them, earning the minimum wage, have to work about six days to pay for entertainment he can afford after about 10 hours' work. "So I often take them out to dinner; they've gotten over being embarrassed by it," he says.

Now a full-time, self-employed programmer, he considers himself fortunate to have a job that he finds enjoyable as well as lucrative. Too many people, he says, are geared for anything but fun in their work places.

Wayne Westmoreland, the thrice-published programmer, has struck a balance between micromania and his other interests. A student at the University of South Carolina at Aiken, he works as a free-lance software designer. He plays the trumpet and baritone sax occasionally and is active in a local computer-user group. "We like to help others get started," he says, noting proudly that at least one other member now also sells his own software and published articles on program writing.

Wesmoreland was always intrigued by electronics and got hooked on computers when he saw his first microcomputer. Shortly afterward he received one as a Christmas gift from his parents, but he was largely on his own when it came to learning programming. With the help of manuals, he and Terry Gilman, his 18-year-old partner, taught themselves assembly language, which was a challenge but essential for writing games that call for fast action.

The partners looked for a company with an attractive ad campaign as a publisher and chose Adventure International of Longwood, Florida, headed by 29-year-old Scott Adams—perhaps the first legend among microgame authors. The company plans to release Westmoreland's and Gilman's fourth game, "Rear Guard," soon.

Unlike Westmoreland, who wrote his first program on a home computer, there are teens such as Mark Turmell of Bay City, Michigan, who started taking college computer courses at age 15 as a voluntary supplement to high-school work. Mark also wrote games on his home micro. By the time he turned 19 last year, he had two popular microgames on the market, published by Sirius Software of Sacramento, California. Motorists puzzled by the cryptic message, "I brake for Artesians," on an occasional bumper sticker, have Turmell to thank. One of his games features a surrealistic landscape inhabited by adversaries called guzzlers, bouncers, and artesians — the last so named by Turmell after the artesian-well water used by the Olympia Brewing Company. Turmell just liked the sound of it, and so did Olympia. The company not only gave the game its blessing but started using artesians in its television commercials.

The micro bug has not bitten many teenage girls, but the epidemic may spread among them, too, as more schools and summer camps offer computer instruction. It was a junior-high computer class in Ridgewood, New Jersey, in fact, that first attracted Laura Hyatt to computers. After finishing the one-semester course, she continued to return to the computer room to practice programming. She also joined a computer club and read programming books at home.

Last spring, at 15, Laura found a temporary job teaching a local insurance company manager how to run a new accounting program and set up a billing system on his office microcomputer. And during high-school hours, she and another girl received independent-study credit in their two-student computer class where, Laura says, they could accomplish more than in a larger class.

As teens and younger children rush toward the 21st Century, speaking a seemingly incomprehensible computer jargon, they sometimes leave parents behind. But as the proud, nonprogramming father of one successful teenage game designer puts it, "We're awfully lucky to have a kid like that. He doesn't get into trouble or mess with drugs." And the father believes the program writing and business experience his son already has will be invaluable for whatever future goals the young man may set for himself.

Carol L. James is a free-lance writer from Van Nuys, California.

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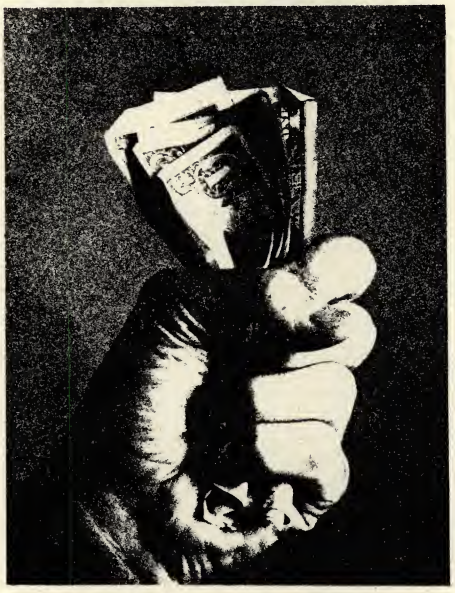

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DATA FURNITURE

by Carole Houze Gerber

Evenutally, home computers will be as common to most households as television sets. With two million already plugged in and humming and another 5 million expected to be sold by 1985, it's little wonder that the furniture industry is blossoming with ideas on where to put them. Desks, consoles, bookcases and other microcomputer accessories make coordinating the home unit with other furnishings a snap. Whether placed in den, living room or home office the following samples of computer furniture illustrate how easily the computer can be blended into any environment.

"Electroniture," manufactured by a Santa Rosa, Calif. firm called The Bench Collection is beautiful furniture in its own right.

The solid oak, hand-rubbed Danish oil finish desks and accessories are crafted on the principle of ergonomics — which means human comfort is the prime consideration.

Monya Noelke, president of The Bench Collection says the furniture's classic lines will make it a prized family heirloom. "It's built to last several lifetimes."

The Bench Collection offers two models. The new Model T is a versatile modular computer table. The owner can choose from a variety of configurations with a bottom shelf, top shelf, hanging shelf for CPUs and multiple paper baskets.

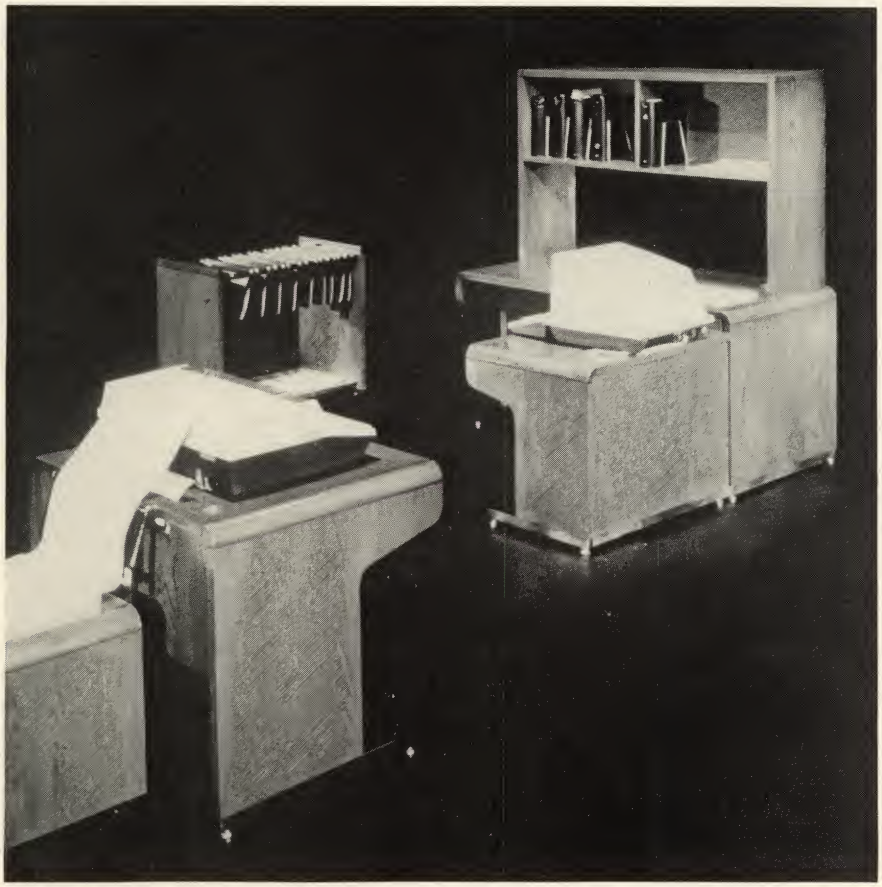
Model B is a computer desk complete with two monitor housings (the Model A has one) encased behind non-glare glass that was originally developed for NASA. The anti-reflective coatings and neutral density filter in the glass reduce eye fatigue and maximize character definition and enhance color displays without distortion.

Shown are The Bench Collection's newest offerings: The Model T with chair, top and bottom shelf and the Model B with two monitor housings and matching printer stand.

Prices for the Model T start at about $450 with options extra, including a top shelf, about $100. CPU shelf, about $75; and chair about $270. Model B starting prices are $1,260 for a two-screen unit and $1,200 for a one-screen unit and small printer stand, about $375. Model A (not shown) prices are $895 for a one-screen unit and $225 for matching printer stand. The desks and tables are shipped unassembled—assembly takes about 20 minutes — and the only tool needed is a screwdriver.

For more information on The Bench Collection Electroniture, call (707) 526-1074 any weekday between 9 a.m. and 5 p.m. PST.

From Gene Spinner, owner of the Wood Works in Lawrence, Kansas, comes elegant, handcrafted furniture at affordable prices. Available in cherry, oak, birch, natural finish or stained, his components are shipped in durable boxes and can be easily assembled with a screwdriver. Spinner says that all tables are typing heights. The complete setup includes a 46" worktable with topsider shelf unit and a printer table. Also available is a 36" worktable. Prices for the worktable and top sider unit combination begin at $195, and Spinner guarantees workmanship on all pieces. For further information, call him at (913) 842-7797 or write the Wood Works, 11th & Haskell, Rt. 2, Box 407, Lawrence, Kan. 66044.



DAR/RAN Furniture Industries, PO Box 672 High Point, N.C. 27261, offers a line of office furnishings suitable for home computers. Called Computer Media Systems, the pieces feature solid core panels with richly grained hardwood veneers of oak and walnut in four finishes. The DAR/RAN line offers more than 100 products in a Computer Media series, including a storage/file cabinet, 34"Wx20"Dx54"H, that could pass as an armoire.

Pictured is a bookcase, desk printer table, paper caddy and hanging file system. Units are built as a single piece and solid lumber is used where screw stress is critical. Prices begin at $375 for the hanging file and range to $1,250 for the workstation. DAR/RAN has showrooms in Chicago, New York, Denver, Dallas, Atlanta and St. Louis, or contact the factory in North Carolina at (919) 431-7153.

Smith System Manufacturing Company, Box 43515, St. Paul,

Minn. 55164, features two complete lines in their "Electronic Furniture Program." Of interest to home computer owners is their Program 2000 series which features Mobile Flex Stations for home, office and school. Shown is the "Application Microcomputer System" which features a single face flex station which holds a complete system in a minimum amount of space. Buyer may specify top color in walnut, teak, golden oak or almond. Enamel or chrome legs are available and prices for the various home systems begin at $180.

For more information on Smith's electronic furniture line, contact sales manager Kenneth Dahlager at (612) 636-3560.

In California, Virco Manufacturing Corporation has recently introduced an expanded line of computer support furniture and accessories. Designed for efficiency and versatility, Data Stations are offered in three heights: desk height, 30"; keyboard height, 26½"; and bi-level height, 26½" and 30". Each data station can be used alone or in combination with other units to create customized work centers. The contemporary design shown features tops and leg inserts in a choice of golden oak or walnut. Tops are particle board with laminated plastic to resist stains, scratches and marring.

Desk station accessories include turntables, typing returns, forms receiver racks, center drawers, storage and electronic modules and wedges to join units. For a free catalog and price list, write Virco at 1331 W. Torrance Blvd., Torrance, Calif. 90501 or call Pamela Blanford, (213) 532-3570.

Among others offering computer furniture suitable for home use are:

- Atlantic Datafurniture Products, Inc. PO Box 15177, Tampa, Fla. 33684
- Biotec Systems, 3158 Production Drive, Fairfield, Ohio 45014
- Haskell of Pittsburgh, Inc., PO Box 5373, Pittsburgh, Pa. 15206
- Asoects, Inc. 11615 Pendleton St., Sun Valley, Calif. 91312
- Artec, 1549 Royal St., Jasper, Ind. 47546
- Tiffany Stand & Furniture Co., 145 Weldon Parkway, Maryland Hts., Mo. 63043

Carole Houze Gerber is a contributing editor to TODAY magazine.

SELECTING THE PROPER COMPUTER WORK STATION

You have a new computer. Where are you going to put it? The answer is not as simple as you think.

The problem is that a computer serves two distinct and in some ways opposing functions. It is an office tool which can help with paperwork, filing and calculations, and it is an entertainment medium. Unless you live alone or with other computer addicts, you may have a hard time finding a spot for the computer which can serve both functions without forcing you to abandon your decorating scheme.

When you use your computer as an office tool you need a quiet office where you can spread out your papers, where your telephone and reference materials are handy. If you also use the computer for entertainment, you will find that it becomes a noisy gathering spot for family and friends.

It it were just the computer — which is smaller than an office-sized electric typewriter — you might be able to put it anywhere. But a computer needs a tape or disc drive or two, a video monitor and perhaps even a printer. Setting up a space that keeps all peripheral attachments handy, yet allows room for several people at the computer at once, might mean building an extra room on the house, or buying two computers, one for work and one for play.

Unfortunately, most of us cannot afford these options. We must seek a workable compromise. When making your compromises, you might want to keep these points in mind:

- Just because it is called a desktop computer does not mean it will function well on a desk. Most desks are 29 inches high, three inches taller than typing height. Computers require typing to enter data. A keyboard on a desk would be too high for comfortable work.

- If you have a special video monitor it should be directly in front of you as you work at the computer keyboard. Some computers are flat on top, to hold the video monitor. The best height is two or three inches above the top of the computer.

- If you plan to use a television console for your video screen, find a way to put the computer in front of the television, but far enough away so that you can see over it to the television screen (unless your console television is mounted high on a cabinet.)

- The computer needs space around it for air circulation. Although the computer is rarely more than 18 inches deep, it should be six inches from the wall behind it. This also gives you room to reach the on/off switch, which is at the back of most home computers.

- You need room for the cassette tape recorder or the disk drives which hold the programs.

- Most desks have kneeholes for only one person; often two people work on a program or play a game together at a computer.

- If you use a printer, you need to put it near enough so that you do not have to get out of your chair everytime you want to put in or take out a piece of paper.

- Computers seem to amass tangled skeins of electrical wires. A good computer station has tracks for these wires which keep them away from feet and chair legs.

- Lighting for the computer should be diffused so that there is no glare on the screen.

- There should be no eating or drinking around the computer. Crumbs and spilled liquids can lead to big — and unnecessary — repair bills.

- The computer generates traffic and noise, and should not be in a room which is too small for visitors or used as quiet a retreat.

- Programs need to be stored safely to avoid damage. There are boxes and cabinets made for that purpose, or you can set aside a drawer or shelf for programs, disks, etc.

- If you use your computer as a terminal for timesharing or a databank, you need a telephone. The telephone company can install a dedicated computer line, and provide a telephone for your computer. Check with the telephone company business office for more information.

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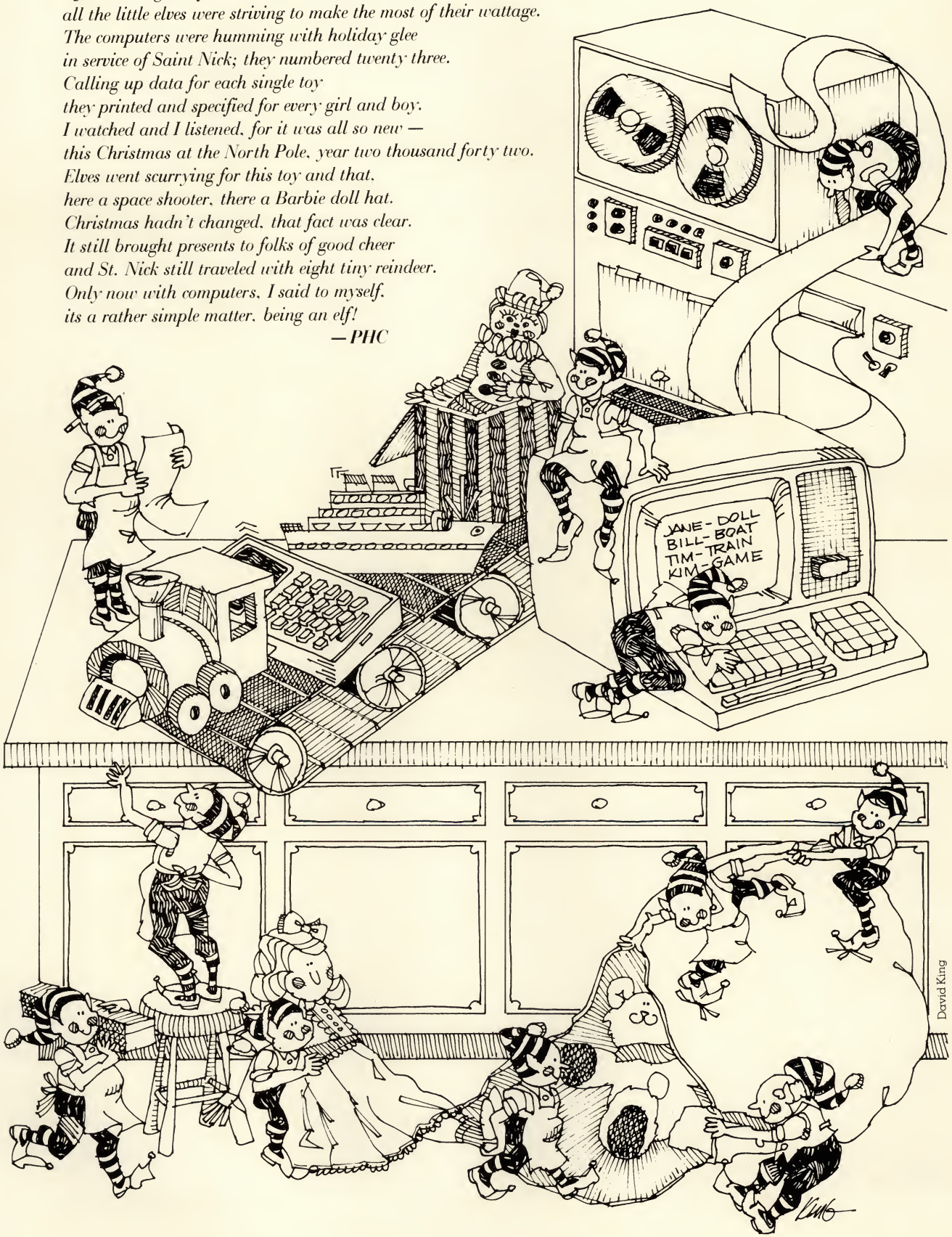
Future

'Twas the night before Christmas and all through the cottage
all the little elves were striving to make the most of their wattage.
The computers were humming with holiday glee
in service of Saint Nick; they numbered twenty three.
Calling up data for each single toy
they printed and specified for every girl and boy.
I watched and I listened, for it was all so new —
this Christmas at the North Pole, year two thousand forty two.
Elves went scurrying for this toy and that,
here a space shooter, there a Barbie doll hat.
Christmas hadn't changed, that fact was clear.
It still brought presents to folks of good cheer
and St. Nick still traveled with eight tiny reindeer.
Only now with computers, I said to myself,
its a rather simple matter, being an elf!

— PHC



David King

THE GAZETTE

December 24, 2042 **Future Edition**

Jolly Old Elf Suspected of Entering 21st Century

computers discovered in The Sugar Plum Factory

by Patricia H. Carro

NORTH POLE. December 24. 2042—Santa Claus. in a rare interview granted in his arctic retreat. said today that despite the ever-increasing world population. Christmas presents will again be delivered chimney-by-chimney this year. Dismissing modern delivery methods utilizing space-express. Claus emphatically stated that when the time came to rely on machines instead of Dasher. Dancer. Prancer. Vixen. Comet. Cupid. Donner. Blitzen and. of course. Rudolph. he would be forced to retire. That day. from all appearances. is light years away.

When questioned as to how he managed to achieve the remarkable feat of manufacturing and distributing millions of items each year within a constrictive time frame of perhaps half a dozen hours. Claus was characteristically vague. "My elves do a tremendous job. as does Mrs. Claus," is his stock answer.

No one. except for employees of Claus. is permitted inside The Sugar Plum Factory. that inner sanctum of North Pole headquarters believed to be the site of all routing and manufacturing activity. Thus. for hundreds of years. the disturbing logistical question surrounding the Claus operation has gone unanswered.

During the past week. *The Gazette* has scoured the North Pole countryside for information in an effort to uncover the truth. The facts we have obtained. through reliable sources including a former elf who was dismissed from the staff just yesterday. are astounding in their implications for society.

Santa Claus. alias St. Nick. is the head of an enterprise that succeeds largely through the efforts of elves. microcomputers and videotex. That's right. *computers.* These sophisticated machines. first introduced in the world nearly a century ago and now an indispensable part of daily life. have become a vital part of the North Pole operation. This information is startling only in the light of the fact that Claus has traditionally stayed so firmly in favor of old-fashioned ways in both dress and mode of transportation.

David Allen King

A tight-lipped Claus reveals little about computerization at the North Pole.

The unemployed elf. who wished to remain anonymous. revealed that he had been dismissed following an episode in which he failed to maintain sufficient quality control in the making of a Tiny Tears doll. He was. however. willing to recount his experiences for *The Gazette* and to give us an "insider's view" of North Pole methods.

Elves. he said. have been trained to operate microcomputers with an efficiency unequalled elsewhere. to produce the world's best toys in record time. Even Claus. when he chooses. can sit down at his personal computer and call up as much information as he wishes to know.

The schedule works as follows: Each day during the month of December. thousands of letters arrive at the North Pole. some via EMAIL (the electronic mail service) and others by traditional dog sled method. The letters are read by Claus himself. and given to the first assistant elf. who logs them in the computer in a cross-reference system according to name. age. location. and toy(s) requested. Claus then refers to the computer's huge network database. which contains specific information on each little boy and girl in the world.

Various criteria are used in determining who has been naughty and who has been nice. according to the dismissed elf. Variables such as cleaning one's plate. doing one's homework. helping one's parents with the stellar shelter cleanup each night. and cheerfully walking one's astrodog without being asked are all taken into consideration.

With the help of a dozen or so elves. Claus directs the next phase of the gift-giving operation. Each elf is assigned a computer to research the availability of wished-for items. Usually. Claus and his cohorts can accommodate requests for Dukes of Hazzard trucks. doctor kits. hula hoops. Strawberry Shortcake dolls. and the like. North Pole researchers have. throughout the year. referred to a database for news on toy trends and so they are ready when millions of requests for Smurf dolls flood the EMAIL system.

Occasionally. however. the North Pole organization finds itself unable to fulfill certain requests. Those asking the red-cheeked man to "give me my own bedroom so I don't have to share it with my yucky sister" or imploring Claus to devise a substitute for broccoli. "so I won't have to eat it for dinner anymore" are referred to the Special Assignments division. Here. an elf researches alternatives via computer so that Claus will not disappoint his petitioners.

In yet another area of The Sugar Plum Factory, computer-controlled robots produce the items at breakneck pace. Elves are stationed strategically throughout the assembly area to assure uniform quality and strict adherence to special requests. ("A puppy dog," for instance, cannot be manufactured by even the most advanced computer," and the elf in charge must then clear the request with a child's parents via EMAIL and make special arrangements for delivery of the pet).

Industry watchers note that Claus' personal wealth must indeed be phenomenal for him to conduct this expensive service. The talkative elf who recently left the employ of Claus said that the North Pole resident had apparently invested his money wisely over the years, and was now able to keep track of his investments with the aid of his computer. While these preparatory tasks take place, Mrs. Claus' computer-enhanced office is buzzing with activity. Recently promoted to Director of Adjutant Santas, Mrs. Claus oversees communication between department store and television Santa substitutes and her husband. Toy requests are funneled through this office to the computer system to insure that not one toy is forgotten. On the eve of December 25, the toys are assembled by the elves for loading onto the sleigh. Claus checks last-minute weather reports throughout the world by scanning his computer terminal screen, and orders that the reindeer, with Rudolph at the helm, be assembled in front of the ancient sleigh. They are soon aloft in the night sky with only a red beacon to indicate their whereabouts.

At this point, the information becomes sketchy. Just how Claus negotiates the airwaves and how he manages to descend chimneys despite his considerable girth and advanced age is unknown. Our informant, the erstwhile elf, has never accompanied Claus on his Yuletide missions of good cheer. *The Gazette* has attempted, unsuccessfully, to obtain information from any reindeer willing to talk, but thus far has met with blank stares.

Claus is now preparing for this year's traditional journey and will say only that " . . . all the good little boys and girls should leave milk and cookies for Santa and sugar for the reindeers" beneath their Christmas trees tonight. Asked to confirm or deny that microcomputers have been installed at the North Pole, Claus will only say, "Ho, ho, ho!"

David Allen King

Mrs. Claus and the Head Elf take a break from the keyboards: Microcomputers play a big part at the North Pole.

The North Pole senior citizen's reluctance to reveal his dependence on computers may, however, be explained in the contents of a letter found by *The Gazette* in The Sugar Plum Factory. It is written by a Mrs. Mary Suburbia and reads: "Dear Santa: I know your policy is to deliver toys only to children, but I hope you'll make an exception for my husband. He wants a new programmable floppy disk for Christmas, he is so crazy about our computer! Why, we can do all sorts of things in no time with its assistance. We can even shop at home, buying clothes and toys for the kids by computer! Gee, Santa, maybe some day we won't even need you. Thanks for your consideration."

It is speculated, based on this letter, that Claus is fearful of losing his job and his lofty position in the eyes of children, and so refuses to talk about computers and their use at the North Pole.

Claus' reluctance is understandable. And totally unfounded, *The Gazette* wishes to announce. Everyone — except Santa, apparently — knows that while computers greatly enhance our lives they are no substitute for the human factor.

Carry on Santa . . . Merry Christmas to all, and to all a good night!

Patricia H. Carro is a free-lance writer from Columbus, Ohio and is a regular contributor to TODAY magazine.

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TODAY
THE VIDEOTEX/COMPUTER MAGAZINE

HOLIDAYS With Videotex

by Patricia H. Carro

As you're preparing your feast for this holiday season, keep in mind the many time-saving features available with videotex. Remember, the holidays are hectic and CompServe Information Service (CIS) is here to make them as enjoyable and hassle-free as possible for you. Use your CIS-assisted imagination, and happy holidays!

There's Gold in Them Thar Stockings!

With only 32 shopping days 'til Christmas, Herbert Homebody decides it's time to tally up his financial score. He wants to know just how generous Santa Claus can be this year.

Calling up the financial information on his home computer, Herbert notes that, while several of his stocks are falling, others are showing signs of significant growth.

Quick Quote on CIS gives him updated figures for the daily net change, for a specific review of his holdings. For general information, Herbert reads the various analysts' reports, including Standard & Poor's General Information File on major, publicly-held companies and the Value Line Data Base-II. He checks Commodity News Service for information on pork bellies and wheat. He reads Raylux Reports to learn the experts' views on today's economy and implications for the coming year.

As he does each year, Herbert calls up the Assets/Liabilities program on CIS. If he's going to spend a fortune on Christmas gifts this year, he wants to be sure he is *worth* a fortune!

Ah, good news. The Homebody household is operating in the black. Now it's time to check the gold. Prices, that is. CIS offers updated prices on gold and other precious commodities. Herbert, as a fairly new speculator in the market, is relieved to see that gold prices have climbed to $638 per ounce.

Now, that should fill a few stockings!

Warm Up With Buyer Tips

"Chestnuts roasting on an open fire" notwithstanding, the Chillfactor family is investigating the new energy-efficient fireplace inserts. They turn to CIS for information, and find it in the reference library section. *Better Homes & Gardens* is featuring a comparison study, which the Chillfactors examine closely for prices, model features, recommended uses and the like. Using CIS saves them the trouble of traipsing around Minneapolis to the dozens of fireplace insert retailers.

Now that CIS has helped the Chillfactors in their purchase decision, the computer is programmed to answer one more burning question. Just how will Santa Claus come down the chimney and through the little door in the fireplace insert? The computer is still puzzling over that one . . .

"Just a Friendly Note ..."

EMAIL on CIS allows us to send and receive mail electronically. You'll no doubt be receiving a Christmas card "update" very similar to the following:

Dear Cousin Thelma:

Another year has come and gone. My, how time flies, especially when you have a personal computer like the one we just purchased, to help with all those mundane tasks. The family is doing fine, as usual.

Harold just received a promotion–his fourth in three months–and is next in line for the presidency of International Widgets Co. (And to think he was your beau before he met me!) We celebrated with a month-long European holiday.

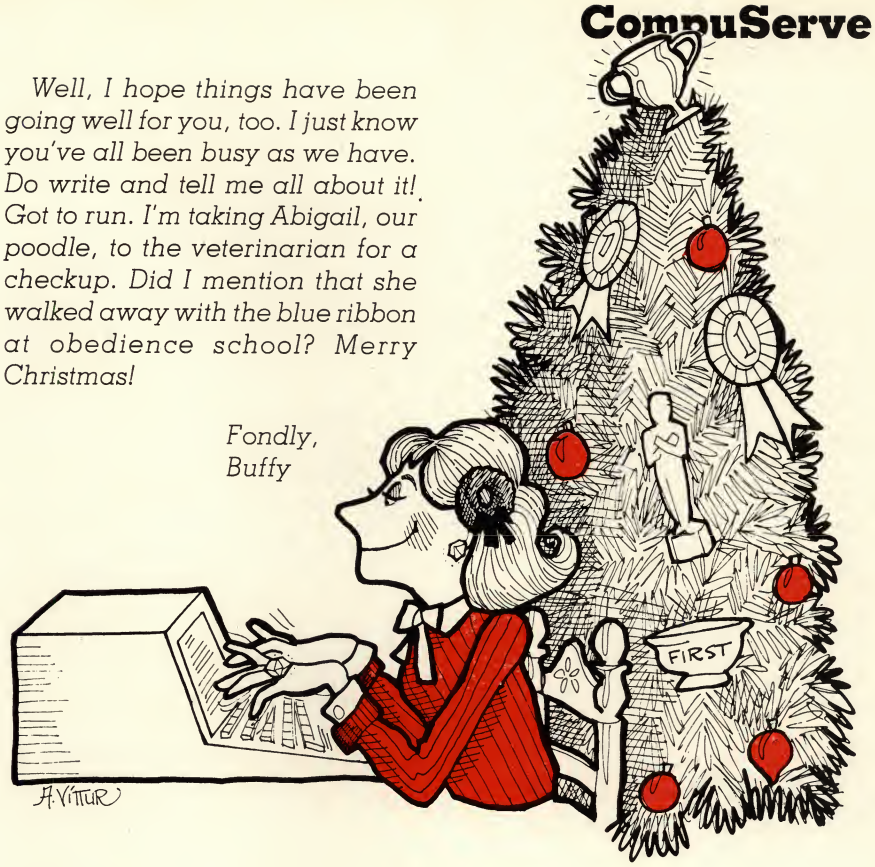
The children are just as clever as ever. Since Donny joined The Rockers band as lead singer, he's been so busy I hardly see him. But I tell myself that it's okay; not every 17-year-old has a hit record on the national charts and receives a scholarship to Princeton!

Speaking of awards, Priscilla has won more than her share, too. Our home computer helped her research her nuclear physics paper, which earned first place in the university's science competition. I used to tell her that she studied too much, but not anymore. Intelligence is one of the most important factors judged in the Miss America contest, in which Pris competed this past September. Our "Miss Texas" didn't win ... but she was named Best Talent winner and has signed a Hollywood contract. How we'll miss her around this old place ... (we sold our other house for a $75,000 profit. Imagine!)

I have been keeping myself busy, too. Last January I began doing a little publicity work for my charity groups. A friend convinced me that I should start my own company — just a sideline, really, but already I've shown a $257,000 profit! Harold says that's probably why I was invited to appear on Good Morning, America *recently.*

Well, I hope things have been going well for you, too. I just know you've all been busy as we have. Do write and tell me all about it! Got to run. I'm taking Abigail, our poodle, to the veterinarian for a checkup. Did I mention that she walked away with the blue ribbon at obedience school? Merry Christmas!

Fondly,
Buffy

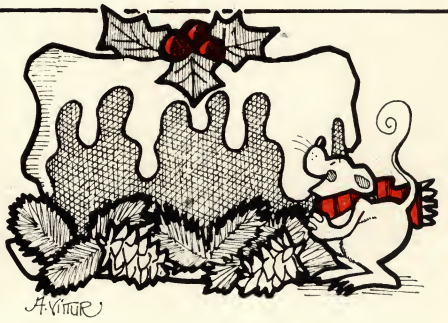


Bake it Festive!

The Yule Log Cake Bake-off is about to begin in the kitchens of *Better Homes and Gardens* magazine. CIS customers have "mailed" their best recipes for this holiday treat, via computer, to the Cook's Underground for consideration.

As a Special Interest Group on CIS, Cook's Underground conducts such bake-offs periodically throughout the year. Members of the group also exchange recipes, recommend specific restaurants and menu offerings in cities throughout the U.S., and generally trade helpful information about appliances, cooking methods, and different products available.

Diana McMillen, food editor for *Better Homes and Gardens* magazine, known as "Ann" in the Cook's Underground, explains that the group serves as a kind of electronic clearing house for information. Since *Better Homes and Gardens* has "thousands upon thousands" of recipes in its library, she and her fellow food editor "Vanessa" (Marcia Stanley) can readily research requests for just about any food recipe imaginable — from scrumptious pot roasts to sinfully delicious funnel cakes.



Recipes for entertaining at home are popular requests on CIS, McMillen notes, and the holiday season heightens interest. After all, it's the time of year that "visions of sugar plums danced in their heads."

Anyone know of a good recipe for sugar plums? Has anyone ever eaten a sugar plum? Get in touch with the Cook's Underground!

Designer Database

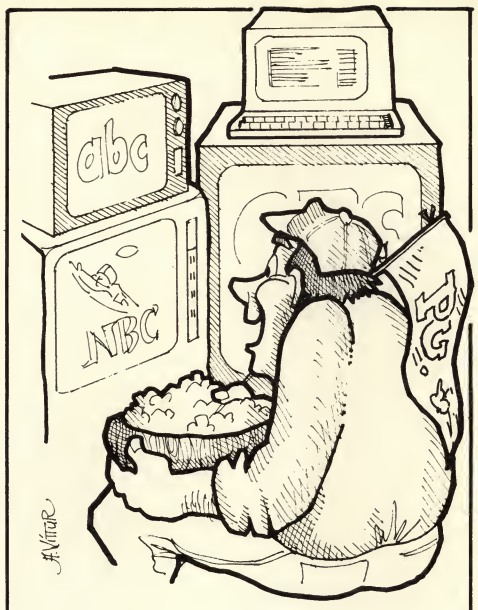
Mr. and Mrs. Yuletide have accepted invitations for a dozen holiday get-togethers. Aside from finding the time and energy to attend them, they have one more problem: what to wear.

Mrs. Yuletide, who changes designer labels as much as Santa Claus comes down chimneys on Christmas Eve, turns to CompuServe for direction. Electronic newspapers and Gandolf's Fashion Report are chock-full of fashion news for the Christmas season. All the fashion mavens are wearing mini-skirts this year, camel suede is *the* color and no one, absolutely no one, will risk being seen in last year's knickers.

Mrs. Yuletide quickly scans the comments of Bill Blass, Anne Klein et al, and concludes that what is fashionable in New York hasn't yet caught on in Kansas City, Missouri.

She can't quite imagine the gold lamé mini-skirt at her office Christmas party, nor can she see the newest aviator jacket eliciting admiring glances at the symphony Christmas concert. She can, however, resurrect her old black velvet culottes for little Jennifer's school Christmas pageant.

Half an hour spent with CIS has given Mrs. Yuletide the scoop on this year's fashion styles. Busy as her holidays will be, she's glad to be armed with this information before braving the store. The gold lamé doesn't sound so outrageous, after all...



Do You Know the Score?

Mr. Armchair Quarterback has installed the very latest video screen in his new media room. Today, New Year's day, he plans to settle down in his favorite recliner and watch football games on all three networks plus two cable stations, *simultaneously*. Mrs. Quarterback checks with him on the hour to make sure his vital signs are still stable.

While the sports commentators will do their utmost to keep Armchair apprised of all the scores, Armchair knows he's bound to miss a few. How can Curt Gowdy know, after all, that Armchair's alma mater is Pigskin U. and they're playing the Podunk Pirates in the Insignificant Bowl today?

Armchair's solution is CIS. He calls up the AP wire for timely updates on all the important games — and a number of unimportant ones as well. Wonderful! PU's Roughnecks are leading by a touchdown. Wait a minute... what's this ... a new score is posted. PU is down by 17. Armchair doesn't want to wait around for the rest. He turns to another video screen, then another. The Rose Bowl, Cotton Bowl, Orange Bowl, Bluebonnet Bowl, Gator Bowl, Fiesta Bowl ... and most important, his popcorn bowl.

Shop-at-Home Santa

This year, Mrs. Holly Day shopped for Christmas presents without leaving her home. On Shop-at-Home, she compared items and values, and selected gifts for every member of the family. Mr Day will get his new fishing pole, and the little Days will find new ice skates beneath the Christmas tree.

Holly orders her presents on CompuServe's Shop-at-Home service before Thanksgiving, so they'll be delivered in ample time for "Santa" to bring them. Since the little Days like to visit the department store Santa, Holly still goes to the shopping mall — but merely to enjoy the decorations, the carolers, and the store-baked gingerbread cookies.

With CIS, Holly doesn't have to worry about shopping. And on the day after Christmas, when the stores are flooded with returns, Holly can rest easy. She spends *her* day preparing tax returns for the year; and since all the information is programmed into her home computer, it's an easy task!

A Holiday-in-a-Holiday

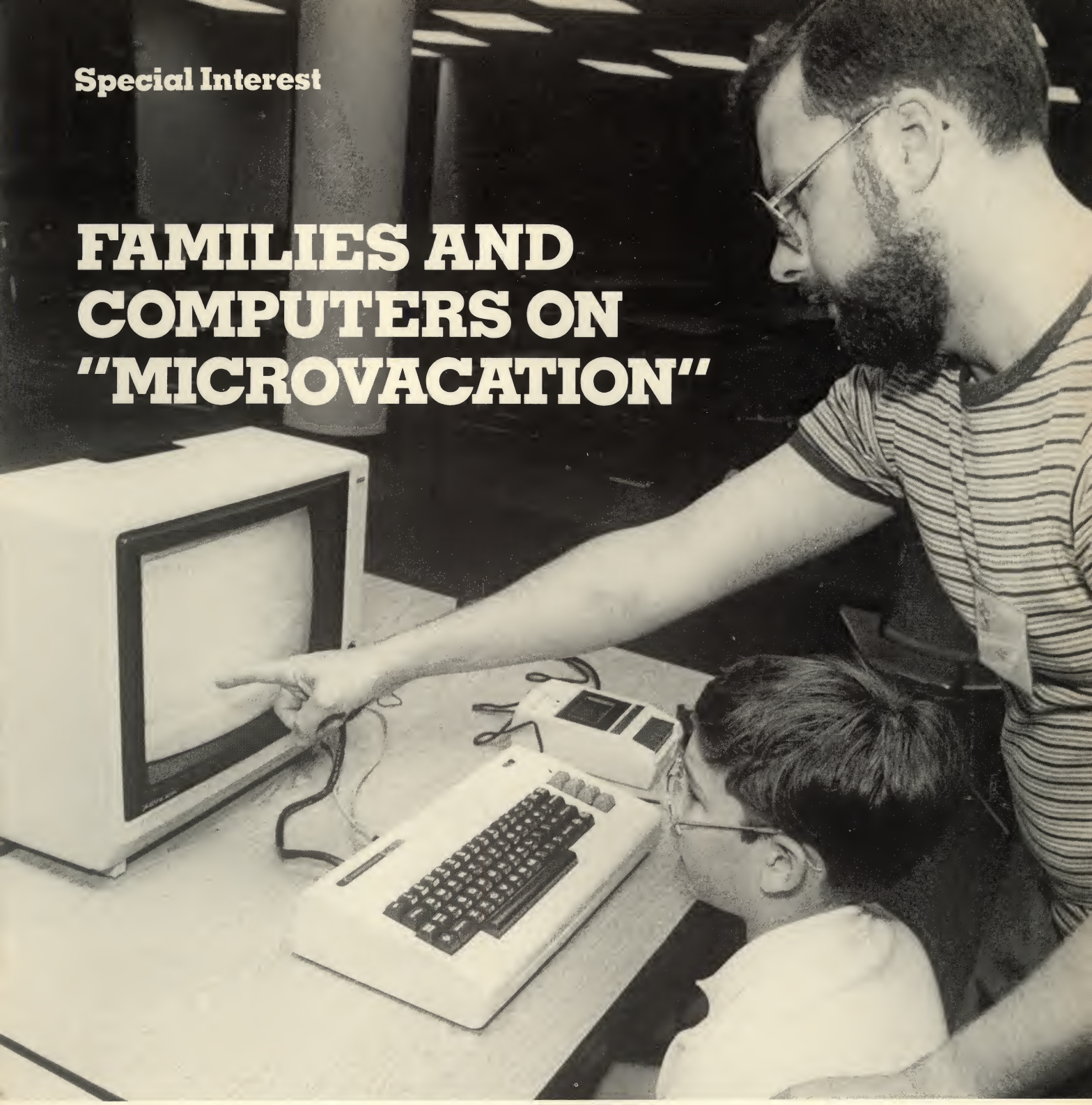
The holiday season is ending, but not for the Yuletide family. Now that the houseguests have departed, the Yuletides are heading for the slopes of Colorado.

Since they're driving from Atlanta, they need up-to-the-minute weather information. A last-minute change in reservations is accomplished through CompuServe's travel service. Before the Yuletides leave the house, they check on ski conditions in Colorado. Good powder... 86-inch base... a chance of more snow. Perfect.

Now that CIS has done all the planning, it seems a bit unfair to leave this trusty assistant behind. Into the trunk the computer goes. Mr. Yuletide wants to communicate with his office during vacation, and EMAIL will allow him to keep in touch.

Patricia Carro is a free-lance writer from Columbus, Ohio.

FAMILIES AND COMPUTERS ON "MICROVACATION"



Gary Mikel

Paul Heermans and his son, John, work on a new program during Clarkson College's Family Computer Camp.

by Steve Schoenholtz

Summer. It's the time of year when some people race to the beach for a healthy tan. Others opt to go into the woods like Thoreau and commune with nature. Then there are those who decide to make their vacation into a shared educational experience. Such was the case for 26 families that made their way to the spacious campus of Clarkson College in Potsdam, New York, to be part of Family Computer Camp, the first of its kind in the country.

The participants, ranging in age from five to 68 spent seven days, from July 25-31, learning and improving their skills with a wide assortment of personal computers. "It's a very short period of time to learn a lot," noted Clarkson Professor David Bray who with his wife Estella, the camp director for the week, organized a small

but efficient instructional staff, including their 16-year-old son Robert.

The Brays are no strangers to the world of computers. David is dean of computing and a professor of electrical and computer engineering at Clarkson and his wife teaches computer technology at the local public school. For the past several summers they've been involved in Clarkson's Elderhostel program, working with people 60 years or older who also have a thriving curiosity for the technology which has had an enormous impact on their lives. (See TODAY, October 1981)

The first night of the camp everyone gathered in the Andrew S. Schuler Educational Resources Center, a $20 million complex equipped with a library, computer and audio visual facilities. The building, which has been featured on the "Today" show was "home" for the 79 campers during the next several days. Under the urging of the Brays, a spokesperson for each family introduced themselves, telling where they were from and why they came. Two families, the Journeauxs and the Noels came from Canada, a two hour drive from the College.

Others weren't that fortunate. Paul Heermans, an electronics technician with the Navy, his wife Charlene and son John came all the way from Bermuda. "We've got this computer sitting in the corner of our house and we don't really know how to use it," said Mr. Heermans who decided to take his family so that they could learn how computers worked and how to make better use of the one they had in Bermuda.

Some parents, like Mary Otto from Arlington, Virginia, came with their children so they could get a head start on a computer course which they would be taking at school in the fall. Many of the other children were already receiving some form of computer instruction in the schools they attended and knew more about the subject than their parents did.

On Monday everyone reported to the Technologically Assisted Education (TAE) room for the first of five days of classes including hands on experience with Atari, Apple, Commodore and IBM personal computers. Some people came prepared by bringing their own machines. Harvey Hayman, a physician from Fayetteville, New York, brought a box full of programs which he accumulated over the years. To make certain no one fiddled with his computer, the doctor put up a hand written sign which read, "THIS IBM PERSONAL COMPUTER IS REALLY PERSONAL... IT'S *MINE*!"

Each morning the camp was broken into several smaller instruction groups by age and ability levels. They were known by such names as Movers, Starters, Shakers, Pac Nicks and Young Nicks. Steven Crist, a professor of electrical and computer engineering at Clarkson, was working with the Pac People, younger students from nine to 13 without any computer experience. "They're very enthusiastic," he beamed. "They aren't playing games either ... they're doing commands, not programs, and I'd say that 70% of them are really into it."

In another section of the TAE room, Estella Bray worked with the Young Nicks, children from five to nine who were learning Turtletalk, better known as LOGO. "We're getting them to interact with the computer by teaching them to operate programs which help them with their spelling and basic arithmetic," she noted. Estella's experience as a public school teacher came in handy as the kids bombarded her with endless questions which she fielded with patience and understanding.

Gary Mikel

Bill Noel (center), a high school science teacher from Ottawa, Ontario, tries his newly learned skills on an IBM personal computer. His five year old son, Ben (right), pays close attention.

Kelly Noel and her husband Bill were just as enthusiastic about how the days were shaping up as their two sons, 9-year-old Ged and 5-year-old Ben. Both parents are teachers for the Ottawa school system which is trying to get more computers into the classrooms. The problem, according to Kelly, who

teaches math and computer science, is that most teachers have had little or no experience with the machines. To correct the situation the Ottawa School Board was putting teachers through massive training programs, one of which Kelly recently took part in as a trainer before coming to Clarkson's computer camp.

As the week slipped by you realized that people were all talking computers. Roger Friedman, a lawyer from Long Island, New York, realized it too. "You can talk to the kids on your own level, so the age difference, intellectually, doesn't make a difference." Mary Otto was also elated. "I'm thrilled to death because I'm going to be able to keep up with my son."

With all the frenzy of computer activities one sometimes forgot that this was also a vacation. People had a wide variety of family oriented things to do like hiking, canoeing, swimming, tennis and a full evening of social programs. But for Jannie Roher from Washington, D.C., and her family the feeling was that the extra curricular activities didn't really matter. "We all hit the computers rather than go outside and do some canoeing," she said. "It's hard to get away from them."

Steve Schoenholtz is director of news services at Clarkson College, Potsdam, N.Y.

CROSS ASSEMBLERS

by James Davenport

The most popular programming language on all microcomputers is BASIC which is what usually comes with the computer when you buy it. However, a computer can not directly execute a BASIC program; it can only execute a set of predefined primitive instructions (machine code). The computer must translate the BASIC statements into the appropriate machine language instructions. This is usually done by a BASIC interpreter which looks at each BASIC keyword as it is encountered and executes the machine instructions necessary to perform the correct function. This can cause your program to run considerably slower than it would if it were written in machine code. It is often necessary to have a section of a program execute faster then BASIC can execute it. The solution is to have that portion of the program written in machine code to have it execute as fast as possible.

The problem then becomes how to write the machine language code. You could figure out exactly what it is that you need done and write the appropriate binary instructions and poke them into memory. This is very difficult to even think about doing and is almost impossible to do without making a mistake. To help alleviate this problem the machine code instructions are given abbreviations called mnemonics. A program written in these mnenomics is called an assembly language program. However, the computer can not directly execute assemble language either. The assembly language program must also first be translated into the correct binary values which the computer can execute. This process is called "assembling" the source code and is performed by an "assembler".

There are several methods to produce machine code from assembly language source statements. Each method has its advantages and disadvantages. Three methods of assembling source code into machine code are described here.

You can go through by hand looking up the values of the assembly language mnemonics in a table of machine codes and calculating address offsets. This is very tedious and usually leads to errors. Simple changes, such as adding another instruction in the middle, are very difficult to make. This method requires no investment except for your time and frustration.

Another method of translating assembly language into machine code is to buy an assembler for your microcomputer. This can range from a small investment ($30) to a several hundred dollar investment. The assembler usually comes with an editor of some sort to let you enter and edit assembly language source statements. For this reason it is sometimes called an Editor/Assembler. Assemblers have the advantage that you can assign names (labels) to memory locations or statements. Since the assembler calculates all address offsets when the program is assembled, using labels makes it easy to add another instruction in the middle of existing code.

One of the major disadvantages of using an assembler on your computer is that you are usually limited to the size of the program you can assemble. Since the assembler runs in your machine, you must have the assembler, your assembly language source program, and sometimes the resulting machine code in your computer's memory at the same time. This can severly limit the size of your program. It can also restrict where your program can reside in memory.

If you only want to write several small programs in assembly language, it may not be cost-effective to buy a powerful assembler.

Another method of assembling is to use a cross assembler. A cross assembler assembles machine code for a processor other than what it is running on. For example, a cross assembler might run on a Z-80 but translate an assembly language program written in 6502 mnemonics to 6502 machine code. The Z-80 could never execute the program it assembled. The object code would first have to be transferred to a 6502 before it could be executed. A cross assembler does NOT translate a Z80 assembly language program to machine code for a 6502; it runs on a processor which is different than the processor for which it is assembling machine code.

Using a cross assembler lets you use all of the facilities available on one computer to assemble machine code for another computer. This could include using storage facilities, editors, and printers which are not available on the target computer.

CompuServe has seven cross assemblers available to use. This means you can write and assemble assembly language source code for your microcomputer on CompuServe's mainframe computers (but you cannot run them). Cross assemblers are available for the RCA CDP1802, 650x, Motorola 6800, Motorola 6809, Intel 8080, National SC/MP, and the Zilog Z80 processors. These cross assemblers provide many features that are not found in most assemblers for microcomputers (conditional assembly, full macro capability, and universal file symbol control).

To write an assembly language program on CompuServe, you must first create a file containing the assembly language source code for your program using one of the editors (e.g. FILGE). For example, if you were going to write an assembly language program for the Z80 you might create the file TEST.Z80. You then run the corresponding cross assembler by typing the command:

R MACZ80

You will then be prompted with:

Source File?

Enter the name of your file, 'TEST'

The cross assembler will then assemble your program and report any errors it finds. After the cross assembler is finished, two additional files will have been created: 'TEST.LST' and 'TEST.OBJ'. The file 'TEST.LST' is the listing of your program. It contains all of your source code along with the addresses and values for each instruction and a cross reference. To obtain a printed copy of the listing enter the command:

PRINTNH/NUM TEST.LST

This will send a copy of the listing file to one of CompuServe's printers and then tell you how many pages were printed. (you may have to first enable the line printer by typing the command 'R PRINT'). The listing will then be mailed to you.

The file 'TEST.OBJ' contains the machine code in Intel hex format. Each line has the format:

:nnaaaa00dd....ddcc

Where 'dd...dd' are the 'nn' data bytes to be stored starting at the address 'aaaa' and 'cc' is the checksum for the line. All numbers are hexadecimal. The sum of all bytes, including the checksum, will be zero. The high order byte of the address preceeds the low order byte in the address. The '00' will always be zero.

You must then transfer the machine code file from CompuServe into your computer's memory. If you are running one of CompuServe's VIDTEX programs, you can load the machine code into your computer's memory using the LODHEX program. The LODHEX program uses an error free protocol to prevent any noise on the communications line from causing an incorrect byte to be loaded into your computer's memory. To run LODHEX, enter the command:

R LODHEX

Your computer will then be interogated to see if it is running a machine language loader (such as VIDTEX). If it is not, LODHEX will exit and not attempt to load the machine code into your computer. If your computer is running a machine language loader, you will be prompted with:

File name to be loaded:

Enter the name of the file containing your machine code (e.g. 'TEST.OBJ'). You will then be prompted with:

Address offset (HEX):

Enter the amount to offset the load address of the machine code. For example, if your program is supposed to load at 1200 (hex) and you wanted to load it at 1400 (hex), yould enter '0200'. If you do not want to offset you program, enter a blank line. The machine code will then be loaded into your computer's memory. LODHEX will tell you the lowest and highest address loaded and the total length of the program. You can then save the machine code to disk or tape for future use.

Some versions of VIDTEX allow you to execute your program also. If you are running a version of VIDTEX which supports this, you will then be prompted with:

Execution address (HEX):

Enter the hexadecimal address at which you want to start execution. If you do not want to start execution just enter a blank line.

The cross assemblers may not always the best method of assembling assembly programs, but they are more powerful than most microcomputer assemblers and may be much less expensive. Complete documentation can be ordered on all of the cross assemblers and the VIDTEX program through the documentation ordering section of the FEEDBK program.

James Davenport is a software development supervisor at CompuServe Incorporated and a frequent contributor to TODAY magazine.

C O N U N D R U M

by Mary Vaughn

JUMBLE
Rearrange each set of scrambled letters to form a simple word. Using the boxed letters from each word, answer the jumble question.

1. VISATNKGGNIH ___ ___ □ ___ ___ ___ □ ___ ___ ___ ___ ___
2. STRUCO □ ___ ___ ___ □ ___
3. UYCERTIS ___ ___ ___ ___ □ ___ ___ □
4. VINDAMALS ___ ___ ___ ___ ___ ___ □ □ ___
5. CKAH □ ___ ___ ___
6. SWARDOPS □ ___ ___ ___ ___ □ ___ ___
7. LMSRSEBERCASSO (TWO WORDS) □ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ □
8. TORCTEP □ ___ ___ ___ ___ ___ ___

David King

9. Now arrange the letters contained within the squares to form the solution

Clue for solution: "What the strange programmer used to decorate his tomb."

□ □ □ □ □ - □ - □ □ □ □ □ □ □ □

See page 43 for solution

Stay in touch with the world anywhere you go.

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The VP3501 is as easy to use as a video game. Just follow the easy-to-understand instructions you get in the User's Guide. Connect the VP3501 to your phone and TV set, turn it on, touch a few keys, and you're in direct contact with a whole new world of information.

Other VP3501 applications.

Although the VP3501 is perfect for those who just want to use CompuServe and other data banks, it's capable of far more sophisticated work. For example, you can do your own computer programming on CompuServe, or on any host computers. In addition to the built-in direct connect modem and RF modulator, the VP3501 has 58-key alphanumeric *and* 16-key calculator keypads . . . resident and user-definable character sets. There's color-locking circuitry for sharp graphics . . . reverse video . . . aural feedback . . . programmable tone and white noise generation . . . even expansion interfaces for printing and cassette recording. And a lot more.

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Try the VP3501 for just 10 days. If not completely satisfied, you can return it to RCA for a full refund.

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In Pennsylvania, call collect to 717-393-0446. Visa and MasterCard orders are accepted by phone. Or mail your order direct to RCA Microcomputer Products, Dept. AW-1182, Customer Service, New Holland Avenue, Lancaster, PA 17604. Be sure to include name and shipping address, telephone number, and payment: $399.00 each, plus $3.00 each shipping, plus applicable state and local taxes. Send check or money order payable to RCA Corp. When using your VISA or MasterCard, send us your signature, account number, expiration date. (If MasterCard, include interbank number). Prices and specifications subject to change without notice.

For more information on CompuServe, please call direct to 800-848-8990. In Ohio, call 614-457-8650.

RCA

NEW AVANT-GARDE PACKAGES

Learn how to run a film projector, create electronic circuit plans and design buildings — all from the Apple II Plus computer and four new packages from Avant-Garde creations.

The mechanics of a film projector need no longer baffle the ordinary user. The courseware disk, Audio-Visual Equipment, offers complete information on the operation of filmstrips, slide projectors, opaque projectors, overhead projectors and 16mm film projectors. In addition, instructions for operation of the Apple Computer are included, making it easy for anyone to learn the basics of these kinds of instructional aids.

Electronics enthusiasts can now use their computer to create and print electronic schematics in a fast and easy manner with the help of Hi-Res Electronic Design, a subsystem of the Hi-Res Secrets Graphics Applications System.

Also available from Avant-Garde Creations is Mentor, a state of the art approach to theoretical circuit design for electronics professionals, hobbyists, educators and students. When working with the Mentor program, a greater portion of circuit design time can be diverted from calculator usage and repeated text reference to more creative applications.

Design buildings with the Hi-Res Architectural Design program, another subsystem of the Hi-Res Secrets Graphics Applications System. The user can plan and design individual rooms, complete floor plans and total buildings using computer graphics assistance, freeing the user from time-consuming drafting and allowing for fast and easy changes in designs.

Audio-Visual Equipment, Hi-Res Electronic Design and Hi-Res Architectural Design are designed for use on the Apple II Plus 48K and each retails for $29.95. Mentor can be used with Apple II, II Plus or III and retails for $124.95.

For further information contact Avant-Garde Creations, P.O. Box 30160, Eugene, Ore. 97403.

CORVUS ADDS OSBORNE I

Corvus Systems has added the Osborne I to its network and mass storage disk systems, giving Osborne owners the speed, reliability and greater storage capacity of Corvus 6, 11 and 20 megabyte Winchester disk mass storage systems.

In addition, Osborne users can share the Corvus disk system as well as printers and other expensive peripherals with the Corvus Multiplexer local area network.

Installation is quick and easy, and prices of Winchester disk systems for the Osborne I start at $3,195 complete with interface card and all required software.

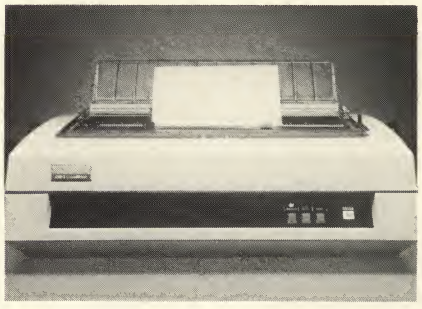
For information contact Corvus Systems, Inc., 2029 O'Toole Ave., San Jose, Calif. 95131.

ATTORNEYS COMPUTER REPORT

Busy lawyers can keep up-to-date on the latest computer news with a new publication written especially for them.

Attorneys Computer Report is published every other week and includes information on computer equipment and software available to lawyers as well as information from users on how well the products work in law practices. The newsletter also tells attorneys how they can use computers to cut costs, better manage their practices and expand services to clients.

Attorneys Computer Report is available from Professional Publications, Inc., P.O. Box 80280, Atlanta, Ga. 30366. The annual subscription rate is $229, and a free sample is available upon request.



THE COMRITER PRINTER

Comrex International recently introduced the ComRiter, a low cost but high quality printer for microcomputer applications.

The new printer features a built-in microprocessor to reduce mechanical parts and increase reliability. Its low noice, linear step motor simplifies the drive mechanism and offers a print speed of 17 CPS.

Three separate interfaces are built into the ComRiter: Qume Sprint 3, RS-232C Serial and Centronics-style Parallel.

The ComRiter also features one-touch, dust-free interchangeable daisy wheels with a wide range of available fonts. The unit is also backed by a full 90-day Comrex warranty.

For more information contact Comrex International, Inc., 3701 Skypark Dr., Suite 120, Torrance, Calif. 90505.

BREVI-T

BREVI-T (pronounced "brevity") is a new software package from SofTrends, Inc., that is designed to provide the user of Apparat's NEWDOS/80 Version 2.0 with the ability to create and use abbreviations for common or difficult to remember DOS and BASIC command sequences.

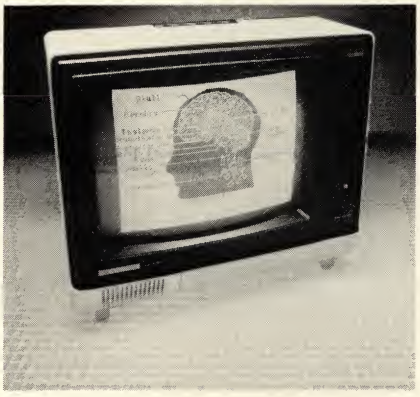
BREVI-T is available nationally through local dealers and mail/phone order companies. For information contact SofTrends, Inc., 26111 Brush Ave., Euclid, Oh. 44132.

NEW BASIS SOFTWARE

BASIS Inc., manufacturer of the BASIS 108 microcomputer, has joined forces with High Technology Software Products to develop new applications software packages specifically designed for the BASIS 108 system. High Technology Software will also adapt some of its existing software to take advantage of programmable function keys and other capabilities of the BASIS 108.

In addition, BASIS Inc. has entered into an agreement with USI Computer Products to offer the new "Pi" series of video display monitors to BASIS dealers in the Pi2 conventional green screen and the new Pi3 amber screen versions. Both models feature 80 character display by 24 lines and are directly compatible with the BASIS 108.

For further information contact BASIS Inc., 5435 Scotts Valley Dr., Scotts Valley, Calif. 95066.



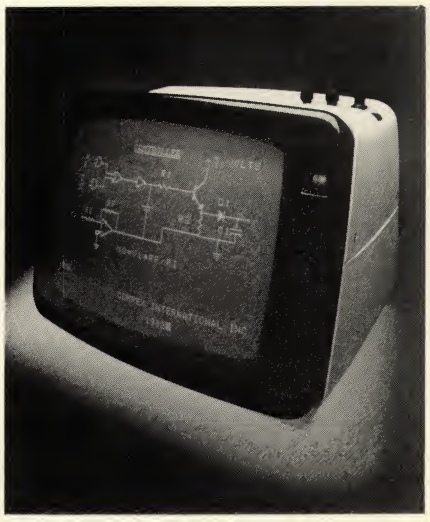
NEW COMREX MONITORS

Three new, high-resolution monitors have been introduced by Comrex International.

Designed especially for word processing applications, the CR-5000 is a monochrome display monitor featuring a non-glare, 12-inch green phosphor screen that displays 24 rows of 80 characters each in an easy to read 7 × 9-inch dot matrix.

The CR-6500 color display monitor features a 13-inch in-line color picture tube for sharp color graphics, automatic degaussing and a built-in speaker with audio circuit.

The third model, the CR-6600 color display monitor, features a sharp RGB signal for a higher resolution than composite signals and crisp, clear color graphics using seven display colors.



For further information contact Comrex International, Inc., 3701 Skypark Dr., Suite 120, Torrance, Calif. 90505.

CONUNDRUM SOLUTION
from pg. 40

1. THANKSGIVING
2. COURTS
3. SECURITY,
4. VANDALISM
5. HACK
6. PASSWORD
7. CROSS ASSEMBLER
8. PROTECT

ANSWER: CRYPT-O-GRAPHICS

SYNERGISTIC SOFTWARE PACKAGES

The Programmer's Workshop and The Disk Workshop are two new utility packages created by Synergistic Software for the Atari 400/800 computer with 32K and one disk drive. Each is actually seven separate programs designed to assist Atari programmers with programming details and functions.

The Programmer's Workshop includes disk to cassette transfer, BASIC program comparison capabilities, cassette baud rate increase and two types of program code analysis.

The Disk Workshop includes disk editing capabilities, fast copying of disks, a formatted disk directory which can be sent to a printer, use of machine language character strings in BASIC, a screendump for the MX-80 Epson Printer with Graftrax or Graftrax Plus and transfer capabilites of large files to disk or cassette.

Both packages retail for $34.95. For information contract Synergistic Software, 830 N. Riverside Dr. Suite 201, Renton, Wash. 98055.

MAGSUB

Small libraries and businesses of any size can store and retrieve important information about magazine subscriptions as well as build a magazine reference index with two new products introduced by Kensoft.

MAGSUB has the capability of storing subscription information on up to 100 magazines, including the date ordered, data received, date paid, amount paid and/or due, check number and amount.

MAGREF is a magazine reference index that enables the user to build a file of magazine articles, including title, issue, page number, article title and a short description. When a specific article must be located, the user may search the file by magazine name, article title or description or the entire file if need be.

MAGSUB requires a TRS-80 Model I or II, LVL II with at least 16K memory and may be purchased on cassette for $7.95. MAGREF is on cassette for $8.95 and is designed for users of the TRS-80 Model I or II, LVL II. Both can be ordered from Kensoft, 2102—50th St., Kenosha, Wis. 53140.

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DATA SECURITY

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channels of the CompuServe Information Service (CB, Bulletin Boards) are self policing communities. Abuse of public areas can be reported to CompuServe's Customer Service department through the on-line Feedback system or by calling the toll-free customer service telephone number.

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COMPUTER LAWS

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code never receives explicit attention in that law. Instead, another provision specifies certain acts as not being copyright infringement, seeming to leave the matter to interpretation.

Richard Stern, of Stern and Roberts in Washington, D.C., says that, indeed, "courts are beginning to

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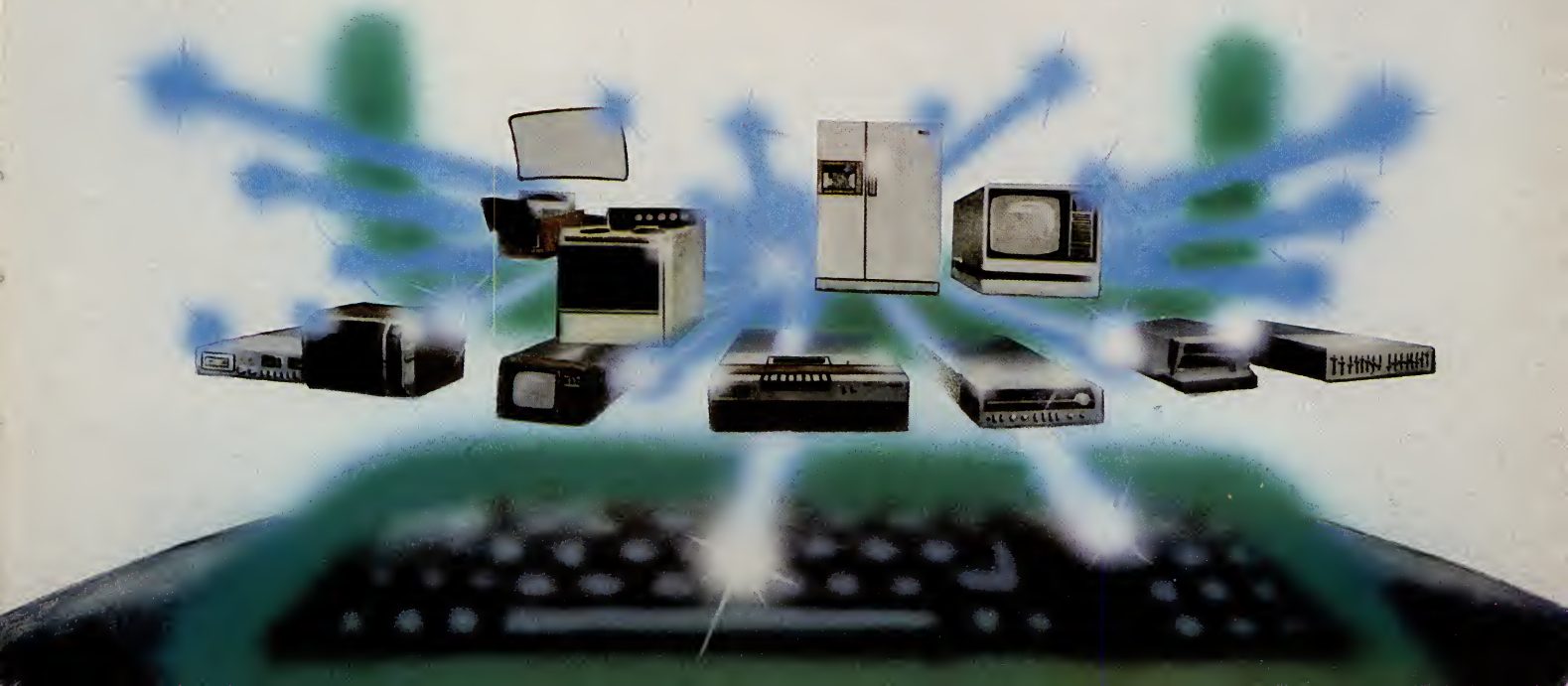

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COMPUTER LAWS

continued from pg. 44

go in the general direction of considering it a copyright infringement" to use someone else's object code. But he cautions that not only isn't object code explicitly covered in the 1980 act, the penalties that law provides if there is an infringement are not appropriate.

The problem that arises from trying to consider object code something that can be copyrighted is that it is legalistically difficult to distinguish the code from the device that stores it, such as a ROM. The code itself, in machine language, is unintelligible even to trained observers, thus making it something that cannot operate independently of the device it's stored on.

A recent court decision involving a video game program, though, appears to make a dent in the dilemma. It was ruled that since the object code produced some of the visual effects of the game, it can be considered to have enough substance and continuity to be considered copyrightable. Nevertheless, the code is useless without the ROM and the two together fall somewhere between communication and a utilitarian item. That puts object code in a gray area between copyright and patent.

Additionally, current law — copyright law — provides for seizure of the copies made from the original, a remedy Stern thinks is inappropriate. "It makes enormously more sense to come up with a separate law. The kind of absolute protection provided under the copyright law is probably wrong for object code. Programmers feel they should be able to use others' ideas, as long as they make a substantial enhancement," he says.

Stern would prefer to see a system of fees or royalties set up so that object code is recognized as a creative effort and the creator can somehow be rewarded for that effort. The notion is that failure to explicitly protect an object code in the copyright law is as wrong as completely preventing others from using it — the way words are written in a book can be copyrighted, but the ideas they express can't be.

The ability of scientists to create increasingly more versatile computers has outstripped legislators' abilities to come up with increasingly more versatile laws. Fewer than half of the states in the country have laws that explicitly outlaw computer crime. The federal government does not have one at all, although widespread support has been demonstrated for the Nelson bill now under consideration. And the copyright laws do not adequately protect the programmer.

But the creation of laws is intimately tied to the painstaking business of achieving a consensus. A computer scientist does not have to worry about that.

Jeff Roedel is a free-lance writer from Cincinnati, Ohio.

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Software Creation and Protection — TODAY examines the issue of software copyright protection, including some novel approaches to the problem.

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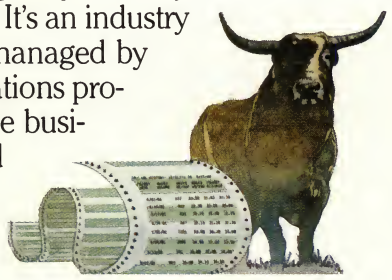

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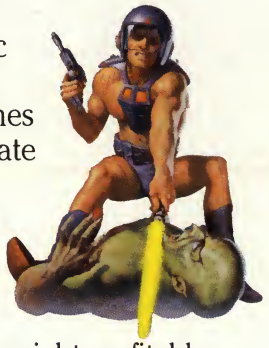

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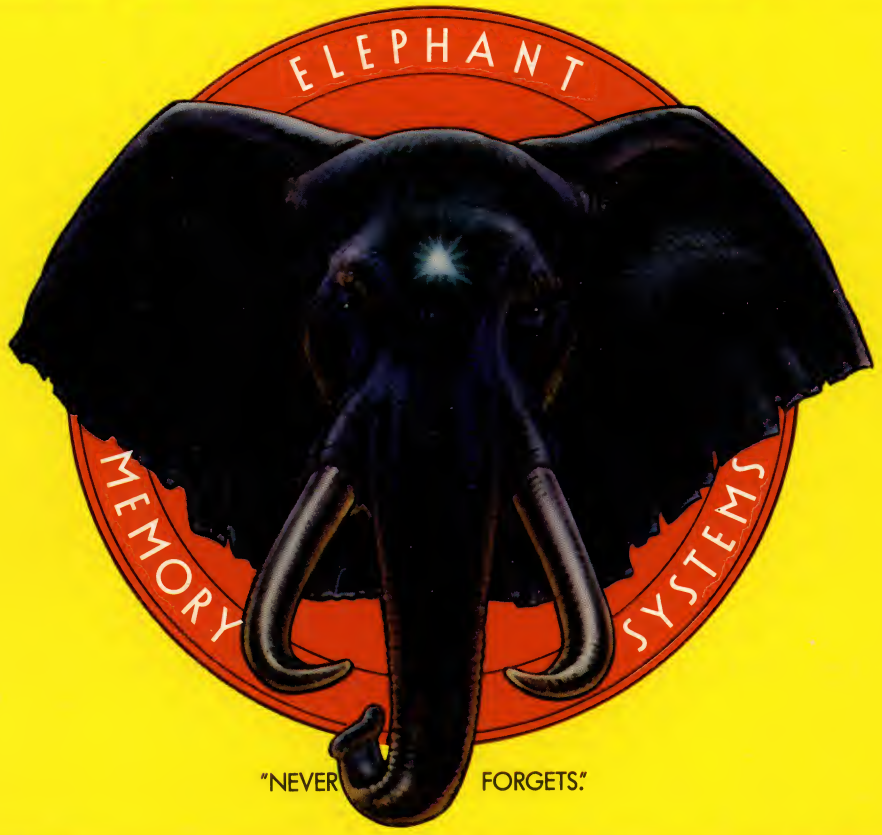

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